

U. S. Dept. of Commerce
APR 7 1959

CRPL-F175 PART A

Central Radio Propagation Laboratory

FOR OFFICIAL USE

PART A
IONOSPHERIC DATA

ISSUED
MARCH 1959

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

CRPL-F175
PART A

NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

Issued
23 March 1959

IONOSPHERIC DATA

CONTENTS

	<u>Page</u>
Symbols, Terminology, Conventions	ii
Predicted and Observed Sunspot Numbers.	v
World-Wide Sources of Ionospheric Data.	vi
Tables of Ionospheric Data.	1
Graphs of Ionospheric Data.	13
Index of Tables and Graphs of Ionospheric Data in CRPL-F175 (Part A).	49

SYMBOLS, TERMINOLOGY, CONVENTIONS

Beginning with data reported for January 1952, and continuing through December 1956, the symbols, terminology, and conventions for the determination of median values used in this report (CRPL-F series) conform as far as practicable to those adopted at the Sixth Meeting of the International Radio Consultative Committee (C.C.I.R.) in Geneva, 1951. Excerpts concerning symbols and terminology from Document No. 626-E of this Meeting are given on pages 2-7 of the report CRPL-F89, "Ionospheric Data," issued January 1952. Reprints of these pages are available upon request.

Beginning with data for January 1957, the symbols used are given in NBS Report 5033, "Summary of Changes in Ionospheric Vertical Soundings, Observing and Scaling Procedures - Effective 1 January 1957," which draws upon the First Report of the Special Committee on World-Wide Ionospheric Soundings (URSI/AGI), Brussels, Sept. 2, 1956. A list of these symbols is available upon request.

In the Second Report of the Special Committee on World-Wide Ionospheric Soundings of the URSI/AGI Committee, May 1957, a new descriptive letter was introduced:

M Measurement questionable because the ordinary and extraordinary components are not distinguishable.

There was an expansion in meaning of the following:

Z (1) (qualifying letter) Measurement deduced from the third magnetoionic component.
(2) (descriptive letter) Third magnetoionic component present.

Beginning with data for January 1945, median values are published wherever possible. Where averages are reported, they are, at any hour, the average for all the days during the month for which numerical data exist.

The following conventions are used in determining the medians for hours when no measured values are given because of equipment limitations and ionospheric irregularities. Symbols used are those given above.

a. For all ionospheric characteristics:

Values missing because of A, C, F, H, L, N or R are omitted from the median count.

b. For critical frequencies and virtual heights:

Values of foF2 (and foE near sunrise and sunset) missing because of E are counted as equal to or less than the lower limit of the recorder. Values of h'F (and h'E near sunrise and sunset) missing for this reason are counted usually as equal to or greater than the median. Other characteristics missing because of E are omitted from the median count.

Values missing because of G are counted:

1. For foF2, as equal to or less than foF1.
2. For h'F2, as equal to or greater than the median.

The symbol W is included in the median count only when it replaces a height characteristic; the descriptive symbol D, only when it replaces a frequency characteristic.

Values missing for any other reason are omitted from the median count.

c. For MUF factor (M-factors):

Values missing because of G or W are counted as equal to or less than the median.

Values missing for any other reason are omitted from the median count.

d. For sporadic E (Es):

Values of fEs missing because of E or G are counted as equal to or less than the median foE, or equal to or less than the lower frequency limit of the recorder.

B for fEs is counted on the low side when there is a numerical value of a higher layer characteristic; otherwise it is omitted from the median count.

S for fEs is counted on the low side at night; during the day it is omitted from the median count (beginning with data for November 1957).

Values of fEs missing for any other reason, and values of h'Es missing for any reason at all are omitted from the median count.

Beginning with data for November 1945, doubtful monthly median values for ionospheric observations at Washington, D.C., are indicated by parentheses, in accordance with the practice already in use for doubtful hourly values. The following are the conventions used to determine whether or not a median value is doubtful:

1. If the count is four or less, the data are considered insufficient and no median value is computed.

2. For the F2 layer, h^*F or $foEs$, if the count is from five to nine, the median is considered doubtful. The E and F1 layers are so regular in their characteristics that, as long as the count is at least five, the median is not considered doubtful. A count of at least 5 is considered sufficient for an h^*Es median.

3. For all layers, if more than half of the data used to compute the medians are doubtful (either doubtful or interpolated), the median is considered doubtful.

The same conventions are used by the CRPL in computing the medians from tabulations of daily and hourly data for stations other than Washington, beginning with the tables in IRPL-F18.

Ordinarily, a blank space in the fEs or $foEs$ column of a table is the result of the fact that a majority of the readings for the month are below the lower limit of the recorder or less than the corresponding values of foE . Blank spaces at the beginning and end of columns of h^*F2 or h^*F1 , $foF1$, h^*E , and foE are usually the result of diurnal variation in these characteristics. Complete absence of medians of h^*F1 and $foF1$ is usually the result of seasonal effects.

The dashed-line prediction curves of the graphs of ionospheric data are obtained from the predicted zero-muf contour charts of the CRPL-D series publications. The following points are worthy of note:

- a. Predictions for individual stations used to construct the charts may be more accurate than the values read from the charts since some smoothing of the contours is necessary to allow for the longitude effect within a zone. Thus, inasmuch as the predicted contours are for the center of each zone, part of the discrepancy between the predicted and observed values as given in the F series may be caused by the fact that the station is not centrally located within the zone.
- b. The final presentation of the predictions is dependent upon the latest available ionospheric and radio propagation data, as well as upon predicted sunspot number.
- c. There is no indication on the graphs of the relative reliability of the data; it is necessary to consult the tables for such information.
- d. The tables may contain median values of either $foEs$ or fEs . The graph of median Es corresponds to the table. Percentage curves of fEs are estimated from values of $foEs$ when necessary.

PREDICTED AND OBSERVED SUNSPOT NUMBERS

The following predicted smoothed 12-month running-average Zürich sunspot numbers were used in constructing the contour charts:

Month	Predicted Sunspot Number										
	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949
December	150*	150*	150	42	11	15	33	53	86	108	
November	150*	150*	147	35	10	16	38	52	87	112	
October	150*	150*	135	31	10	17	43	52	90	114	
September	150*	150*	119	30	8	18	46	54	91	115	
August	142	150*	150*	105	27	8	18	49	57	96	111
July	141	150*	150*	95	22	8	20	51	60	101	108
June	143	150*	150*	89	18	9	21	52	63	103	108
May	146	150*	150*	77	16	10	22	52	68	102	108
April	150*	150*	150*	68	13	10	24	52	74	101	109
March	150*	150*	150*	60	14	11	27	52	78	103	111
February	150*	150*	150*	53	14	12	29	51	82	103	113
January	150*	150*	150*	48	12	14	30	53	85	105	112

*This number is believed representative of solar activity at a maximum portion of the current sunspot cycle.

The latest available information follows concerning the corresponding observed Zürich numbers beginning with the minimum of April 1954. Final numbers are listed through June 1958.

Observed Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	9	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	146	150	151	156	160	164
1957	170	172	174	181	186	188	191	194	197	200	201	200
1958	199	201	201	197	191	187	185	184				

WORLD-WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 72 and figures 1 to 137 were assembled by the Central Radio Propagation Laboratory for analysis and correlation, incidental to CRPL prediction of radio propagation conditions. The data are median values unless otherwise indicated. The following are the sources of the data in this issue:

Commonwealth of Australia, Ionospheric Prediction Service of the Commonwealth Observatory:

Hobart, Tasmania

Townsville, Australia

Commonwealth of Australia, Department of the Interior:
Macquarie I.

Australian Department of Supply and Shipping, Bureau of Mineral Resources, Geology and Geophysics:

Watheroo, Western Australia

University of Graz:
Graz, Austria

Meteorological Service of the Belgian Congo and Ruanda-Urundi:
Leopoldville, Belgian Congo

Universidad Mayor de San Andres:
La Paz, Bolivia

Defence Research Board, Canada:
Alert, Canada

Danish National Committee of URSI:
Godhavn, Greenland

French National Center for Telecommunications Studies:
Dakar, French West Africa
Djibouti, French Somaliland
Tananarive, Madagascar

The Royal Netherlands Meteorological Institute:
De Bilt, Holland

Indian Council of Scientific and Industrial Research, Radio Research Committee, New Delhi, India:
Bombay (All India Radio)
Kodaikanal (India Meteorological Department)
Madras (All India Radio)
Tiruchi (All India Radio)

Geophysical and Geodetic Institute, Genoa, Italy:
Monte Capellino, Italy

Christchurch Geophysical Observatory, New Zealand Department of
Scientific and Industrial Research:
Campbell I.
Cape Hallett (Adare), Antarctica
Christchurch, New Zealand

South African Council for Scientific and Industrial Research:
Marion I.

United States Army Signal Corps:
Adak, Alaska
Cape Canaveral, Florida
Fletchers Ice I.
Ft. Monmouth, New Jersey
Grand Bahama I.
Okinawa I.
St. John's, Newfoundland
Thule, Greenland

National Bureau of Standards (Central Radio Propagation Laboratory):
Anchorage, Alaska
Chimbote, Peru
Point Barrow, Alaska
Talara, Peru (Instituto Geofisico de Huancayo)
Washington, D. C.
.

TABLES OF IONOSPHERIC DATA

December 1958 - October 1958

Table 1

Anchorage, Alaska (61.2°N, 149.9°W)							December 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	(3.0)							(2.60)
01	(3.0)							2.50
02	(3.3)							(2.42)
03	(3.25)							(2.40)
04	(3.6)							2.50
05	3.7							2.55
06	(3.6)							2.55
07	(3.85)							(2.50)
08	(4.5)							(2.70)
09	(6.9)							(2.90)
10	9.4							3.10
11	11.4							3.10
12	12.7							3.05
13	13.5							3.05
14	13.2							<130 2.05
15	12.35							3.00
16	11.25							3.00
17	9.8							3.05
18	7.8							3.00
19	5.9							3.10
20	4.4							2.92
21	3.9							2.95
22	(3.2)							2.75
23	2.9							2.65

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 3

Adak, Alaska (51.9°N, 176.6°W)							November 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	3.5	<320						2.50
01	3.5	<335						2.45
02	3.4	<350						2.50
03	3.3	<350						2.45
04	3.3	<340						2.42
05	3.3	<335						2.42
06	3.5	<290						1.2
07	6.6	240		145	1.62	2.6		2.90
08	10.4	230		115	2.30	2.4		3.15
09	13.75	225		113	2.65	3.4		3.10
10	15.25	225		113	2.90	3.4		3.10
11	15.9	225		111	3.05			3.10
12	16.0	220		115	3.02	3.2		3.00
13	15.45	225		<117	3.00			3.00
14	15.1	230		119	2.72			3.00
15	14.3	220		123	2.30	2.3		3.00
16	12.9	220		125	---	1.8		3.00
17	10.7	220				1.6		3.05
18	8.35	215				1.8		3.05
19	5.8	230				1.8		3.15
20	4.1	240				1.2		3.05
21	3.6	(260)						2.88
22	3.35	280						2.72
23	3.4	<305						2.60

Time: 180.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 5

Thule, Greenland (76.6°N, 68.7°W)							September 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	6.45	260						2.50
01	(6.5)	265						(2.60)
02	(6.65)	255						(2.70)
03	(6.3)	260						(2.70)
04	(5.7)	260						(2.70)
05	6.15	260		<130	2.10			2.72
06	6.35	260						2.70
07	6.7	250		119	2.50			2.00
08	>7.2	250		117	2.70			2.75
09	6.7	240		111	2.62			2.65
10	(580)	7.4	245	4.0	111	2.90		2.62
11	(640)	7.6	240	4.4	111	3.00		2.60
12	(540)	7.2	240	4.4	111	3.00		2.60
13	490	7.4	(235)	4.4	113	2.95		2.62
14	(450)	7.15	240	4.1	117	2.90		2.58
15	7.7	250		119	2.75			2.60
16	7.15	255		120	2.50			2.65
17	7.65	270		127	2.38			2.65
18	7.5	270		129	2.12			2.70
19	7.2	<270				(2.00)		2.70
20	7.4	280						2.62
21	7.1	270						2.62
22	7.65	270						2.70
23	(7.2)	260						(2.78)

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 2

Washington, D.C. (38.7°N, 77.1°W)							December 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00								2.75
01								2.80
02								2.80
03								2.85
04								2.80
05								2.70
06								2.80
07								2.85
08								3.10
09								3.10
10								3.00
11								2.95
12								2.85
13								2.80
14								2.75
15								2.75
16								2.80
17								2.80
18								2.85
19								2.85
20								2.85
21								2.80
22								2.75
23								2.80

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 4

Point Barrow, Alaska (71.3°N, 156.8°W)							October 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00								3.5 (2.60)
01								3.9 (2.60)
02								3.7 (2.70)
03								3.8 (2.50)
04								>2.1 (2.40)
05								2.5 (2.50)
06								2.6 (2.50)
07								2.8 (2.75)
08								2.80
09								2.90
10								2.90
11								2.95
12								2.90
13								2.95
14								2.80
15								2.80
16								2.65
17								2.65
18								2.50
19								2.60
20								2.65
21								2.60
22								2.65
23								(2.70)

Time: 150.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 6

Godhavn, Greenland (69.3°N, 53.5°W)							September 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00								(2.55)
01								(2.60)
02								(2.50)
03								(2.60)
04								(2.50)
05								(2.65)
06								(2.75)
07								(2.00)
08								2.80
09								2.75
10								2.80
11								2.50
12								2.65
13								2.60
14								2.60
15								2.60
16								2.60
17								2.60
18								2.50
19								2.60
20								2.65
21								(2.60)
22								(2.52)
23								(2.55)

Time: 45.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 16.2 seconds.

Table 7

Ft. Monmouth, New Jersey (40.4°N, 74.1°W)							September 1950	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		7.2	290					2.60
01		6.8	290					2.60
02		6.65	300					2.55
03		6.4	290					2.55
04		6.0	290					2.50
05		5.65	280					2.60
06		6.95	260		124	----		2.95
07	---	9.3	240	---	119	2.95		3.00
00	---	10.3	230	---	115	3.42		2.95
09	---	10.2	225	---	115	(3.60)		2.85
10	(465)	10.6	220	5.3	114	>3.90		2.70
11	(480)	10.8	220	---	111	(4.00)		2.65
12	(420)	10.05	225	6.2	113	(4.00)		2.50
13	(470)	10.7	230	---	111	4.00		2.55
14	(435)	10.7	230	6.1	111	3.90		2.55
15	(425)	10.55	235	---	111	3.70		2.60
16	---	10.5	245	---	115	3.30		2.60
17	---	10.3	250	---	119	2.70		2.65
18		10.1	260	---	----			2.70
19		9.6	260	---	----			2.65
20		8.7	260	---	----			2.60
21		8.3	280	---	----			2.60
22		7.0	285					2.60
23		7.55	285					2.60

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 9

Thule, Greenland (76.6°N, 68.7°W)							August 1950	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	---	(6.0)	265		111	2.00		2.68
01	---	6.3	270		112	2.05		2.70
02	---	(6.0)	260		109	(2.20)		2.05
03	---	6.0	250	---	109	2.38		2.75
04	---	5.8	250	---	111	2.50		2.62
05	---	5.6	240	---	109	2.65		2.65
06	(450)	5.8	240	4.4	107	2.80		2.60
07	495	>6.0	240	4.5	103	3.00		2.50
08	460	5.9	235	4.6	101	3.10		2.55
09	560	6.0	225	4.6	101	3.20		2.50
10	515	6.0	220	4.8	101	3.30		2.50
11	495	5.9	210	4.0	100	3.30		2.55
12	515	6.7	220	4.8	99	3.30		2.50
13	480	6.2	220	4.7	99	3.30		2.50
14	490	6.05	220	4.8	101	3.20		2.45
15	475	6.4	230	4.7	103	3.15	3.9	2.40
16	475	6.3	240	4.4	(107)	3.05	4.1	2.50
17	445	6.45	240	4.0	103	2.90	3.4	2.52
18	(440)	6.2	250	---	109	2.75	3.0	2.55
19	---	6.1	250	---	109	2.52		2.58
20	---	6.0	260	---	112	2.40		2.58
21	---	5.9	260	---	107	2.22	2.7	2.70
22	---	6.3	265	---	114	2.05		2.60
23	---	6.2	270	---	111	2.05		2.65

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 11

St. John's, Newfoundland (47.6°N, 52.7°W)							August 1950	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		6.2	300			2.2		2.50
01		6.0	300			2.7		2.50
02		5.6	300			2.4		2.50
03		5.0	305			1.9		2.50
04		4.9	295		<121	----	1.6	2.70
05		5.55	260		(120)	2.20		2.85
06	(600)	6.2	240	4.5	111	2.80	2.9	2.90
07	(375)	6.65	230	5.0	105	3.30	3.3	2.85
00	400	6.7	225	5.2	105	3.58	3.7	2.80
09	480	6.95	<220	5.4	104	3.80	3.9	2.60
10	430	7.1	220	5.6	103	4.00		2.60
11	480	7.1	220	5.8	101	4.10		2.55
12	480	7.2	220	5.8	105	4.02		2.50
13	485	7.3	220	5.0	105	4.00		2.50
14	460	7.4	220	5.7	109	3.90		2.50
15	410	7.4	220	5.5	107	3.60		2.60
16	400	7.6	230	5.2	105	3.30		2.55
17	(405)	7.5	240	---	111	2.95	3.0	2.62
18		7.8	270	---	119	2.20	2.7	2.70
19		7.95	270	<120	---	3.0	2.65	
20		7.9	275			3.1	2.60	
21		7.6	275			1.4	2.55	
22		7.0	290				2.55	
23		6.4	300				2.45	

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 8

Fletchers Ice I. (79.0°N, 122.0°W)*							August 1950	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		---	6.1	(270)	---	(111)	(2.50)	2.50
01		---	6.3	<200	---	(111)	---	2.65
02		---	6.05	<200	---	(113)	(2.10)	2.60
03		---	6.0	<200	---	(110)	2.12	2.60
04		---	6.1	<200	---	(111)	---	2.60
05		---	6.3	(275)	---	111	2.35	2.62
06		---	6.2	(270)	---	(111)	2.30	2.60
07		(405)	6.0	<270	4.0	109	2.50	2.60
00	<395	5.95	(260)	4.0	109	(2.62)	2.60	
09	440	6.0	(250)	4.3	(109)	---	2.52	
10	440	5.9	<250	4.4	105	(2.00)	2.50	
11	440	6.0	235	4.5	105	(3.05)	2.55	
12	450	6.5	(230)	4.6	103	---	2.45	
13	470	6.0	(220)	4.6	103	---	2.50	
14	500	5.8	(230)	4.6	101	---	2.40	
15	400	5.95	<235	4.8	103	---	2.40	
16	480	6.0	(240)	4.7	103	---	2.45	
17	500	6.1	<250	4.7	103	---	2.40	
18	400	5.8	<250	4.7	105	(3.15)	2.40	
19	480	5.75	245	4.5	105	(3.10)	2.40	
20	450	6.0	(250)	4.3	109	2.95	2.50	
21	465	6.0	<260	4.3	109	(2.80)	2.50	
22	450	6.0	(265)	4.1	109	(2.62)	2.50	
23	---	6.0	(270)	3.9	109	(2.50)	2.50	

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

*Preliminary estimated average position.

Table 12

Graz, Austria (47.1°N, 15.5°E)							August 1950	
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		>6.6	330					2.55
01		>6.4	350					2.60
02		>4.9	350					2.60
03		>4.7	340					2.60
04		>4.7	335					2.65
05		>4.7	300					
06		>6.7	250					
07		>7.8	240	(4.8)	105	---	4.2	
08		>8.4	230	(5.1)	110	3.4	4.1	
09		>8.6	220	(6.0)	120	3.8	4.5	
10		>8.8	220	(6.0)	120	3.8	4.5	
11		>8.7	210	---	105		4.3	
12		>8.8	220	---			4.4	
13		390	(8.9)	220	(6.1)		4.1	
14		390	0.0	220	(6.0)	125	3.6	
15		380	(8.8)	230	(6.0)	125	3.7	
16		400	8.4	230	---	3.5	3.6	
17	(340)	8.5	240	---	---	---	3.6	
18	---	(8.4)	260	---				
19		>8.3	270					
20		>8.2	290				4.1	
21		>8.8	200				4.1	
22		>8.8	300					
23		>8.6	330					

Time: 15.0°E.

Sweep: 2.0 Mc to 20.0 Mc in 50 seconds.

Table 13

Grand Bahama I. (26.6°N, 78.2°W)							August 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	7.5	300			2.6	2.60		
01	7.5	290			2.2	2.65		
02	7.0	285			2.4	2.65		
03	6.8	280				2.60		
04	6.4	280				2.60		
05	6.1	260				2.68		
06	6.95	260		<129	(1.95)	2.0	2.90	
07	8.5	235		---	107	3.45	3.9	3.00
08	9.5	220		---				
09	(420)	9.9	215	5.7	105	3.78	4.5	2.70
10	380	10.4	210	6.2	103	4.05	4.6	2.60
11	390	10.75	<220	6.5	103	4.25	4.8	2.55
12	375	10.9	215	6.3	105	4.40	4.7	2.55
13	390	10.8	220	6.3	105	4.40	4.6	2.55
14	400	10.4	220	6.3	103	4.28	4.5	2.55
15	390	10.1	220	6.0	103	4.05	4.4	2.60
16	370	9.8	(225)	(5.6)	(105)	3.75	4.1	2.60
17	---	9.5	(240)		(109)	3.25	3.8	2.65
18		9.2	250		(112)	2.55	3.2	2.70
19		8.9	255			3.2	2.70	
20		8.2	255			2.5	2.60	
21		7.9	275			2.4	2.60	
22		7.7	290			2.8	2.60	
23		7.6	305			3.1	2.55	

Time: 75.0°N.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 15

Talara, Peru (4.6°S, 81.3°W)							August 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	10.5	230				2.70		
01	10.5	240				2.00		
02	10.2	240				2.98		
03	9.0	235				3.12		
04	7.2	230				3.10		
05	5.4	230				3.15		
06	4.2	250				2.80		
07	7.35	260		125	2.35	2.6	2.05	
08	9.4	240		111	3.20	3.4	2.75	
09	10.4	<230		109	3.70		2.40	
10	11.0	210		107	4.00		2.25	
11	11.6	210		108	4.20		2.15	
12	11.9	205		107	4.30		2.10	
13	12.1	<205		107	4.30		2.05	
14	12.0	200		107	4.20		2.05	
15	11.0	210		105	3.95		2.00	
16	11.4	220		107	3.60	4.0	2.00	
17	11.2	245		111	3.10		2.05	
18	11.0	280		125	2.35	2.4	2.05	
19	10.5	370				2.05		
20	10.3	405				2.10		
21	10.6	350				2.35		
22	(10.8)	275				(2.65)		
23	10.9	235				2.70		

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 17

La Paz, Bolivia (16.5°S, 68.0°W)							August 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00	8.0	220				2.90		
01	8.2	220				2.95		
02	7.3	225				3.00		
03	6.5	225				2.85		
04	6.0	240				2.90		
05	5.35	250				2.98		
06	5.2	255				2.98		
07	7.0	275		(135)	1.90		2.90	
08	10.55	245		111	2.90		2.95	
09	12.3	230		109	3.50	4.6	2.75	
10	>13.0	220		109	(3.85)	5.0	2.40	
11	(13.2)	215		109	(4.15)	5.0	(2.30)	
12	(12.4)	210		105	(4.20)	5.2	(2.25)	
13	11.95	210		100	(4.22)	5.1	2.20	
14	>11.8	200		105	---	4.9	2.15	
15	11.6	210		107	(3.95)	5.0	2.15	
16	11.5	225		107	(3.65)	5.2	2.15	
17	10.9	245		109	(3.05)	5.1	2.18	
18	10.6	290		<121	2.20	4.5	2.20	
19	9.7	345				2.20		
20	8.95	360				2.10		
21	8.75	300				2.30		
22	9.0	255				2.50		
23	9.0	230				3.4	2.78	

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 13

Okinawa I. (26.3°N, 127.8°E)							August 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			11.5		290			2.60
01			11.5		290			2.70
02			10.8		250			2.75
03			9.3		255			2.65
04			8.1		270			2.65
05			7.1		280			2.55
06			7.55		270			2.05
07			9.4		235			3.05
08			9.55		225			2.90
09			9.4		220			4.1
10			(390)	10.1	210			2.70
11			380	11.6	(220)	(6.6)		2.55
12			395	12.3	225	(6.7)		2.60
13			400	12.5	(230)	(6.7)		2.55
14			400	13.05	225	6.5		2.50
15			390	13.15	230	(6.3)		2.60
16			365	13.6	<240	6.3		2.60
17			340	13.3	240	---		2.65
18			320	>12.7	255	---		2.70
19			>11.55		275			2.72
20			>11.2		290			4.7
21			>11.25		300			2.50
22			>10.9		295			2.65
23			>11.2		295			2.50

Time: 135.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 15

Chimbote, Peru (9.1°S, 78.6°W)							August 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			8.6		240			2.70
01			8.9		240			2.90
02			0.3		235			3.05
03			7.65		230			3.10
04			6.65		230			3.05
05			5.6		240			3.00
06			4.7		260			2.72
07			8.0		260			2.05
08			10.2		240			2.75
09			11.05		230			2.45
10			11.3		220			2.30
11			11.3		210			2.20
12			11.3		210			2.10
13			11.15		210			2.10
14			10.9		210			2.05
15			10.05		225			2.00
16			9.55		300			2.10
17			8.9		400			2.00
18			8.25		410			2.10
19			8.6		340			2.30
20			8.25		270			1.8
21			8.5		240			2.60
22			8.25		240			2.70
23			8.25		240			2.70

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 17

Watheroo, W. Australia (30.3°S, 115.9°E)							August 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			>4.3		<240			3.30
01			>4.3		(245)			3.10
02			(4.5)		<245			3.20
03			>4.3		(245)			<3.30
04			>4.3		<250			3.15
05			4.4		(245)			3.20
06			>4.3		(230)			<3.20
07			>6.5		230			3.40
08			>10.5		220			<3.55
09			>10.5		215			3.65
10			>10.5		215			3.65
11			>10.5		210			3.60
12			<295	10.5	<215	6.5	100	3.95
13			>300	10.5	(215)	6.4	100	3.90
14			<305	10.5	<205	(7.1)	100	3.85
15			<305</					

Table 19

Hobart, Tasmania (42.9°S, 147.2°E)								August 1958	
Time	h°F2	foF2	h°F	foF1	h°E	foE	foEs	(M3000)F2	
00	(5.4)	200						(2.50)	
01	(4.6)	290						(2.60)	
02	>4.5	280						(2.60)	
03	>4.5	280						(2.70)	
04	4.5	280						(2.70)	
05	>4.4	270						2.70	
06	4.0	260						2.75	
07	(5.7)	250						(3.00)	
00	>0.3	230						3.25	
09	>10.1	230						3.15	
10	11.2	230						3.10	
11	11.9	230						3.00	
12	>12.0	230						2.95	
13	>11.5	230						2.85	
14	>11.5	230						2.05	
15	>11.0	230						(2.90)	
16	>10.5	230						---	
17	>10.1	230						(2.95)	
18	(9.0)	230						(2.90)	
19	(8.8)	240						2.85	
20	(7.6)	240						2.80	
21	6.8	250						2.70	
22	>6.0	260						2.70	
23	(5.7)	270						(2.70)	

Time: 150.0°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 21

Thule, Greenland (76.6°N, 68.7°W)								July 1958	
Time	h°F2	foF2	h°F	foF1	h°E	foE	foEs	(M3000)F2	
00	(400)	5.5	250	---	111	(2.35)		(2.50)	
01	(400)	(5.4)	245	---	109	(2.32)		(2.65)	
02	(545)	5.5	245	---	109	(2.40)		2.50	
03	(460)	(5.5)	235	4.0	107	2.52		(2.70)	
04	530	(5.3)	230	4.0	105	2.65		2.40	
05	530	5.4	230	(4.2)	105	2.00		2.65	
06	510	5.1	220	4.4	103	3.00		(2.40)	
07	520	5.4	220	4.5	101	3.10		2.50	
08	490	5.6	220	4.6	101	3.20		2.40	
09	500	5.6	210	4.7	101	3.30		2.40	
10	<540	5.5	210	4.7	101	(3.35)		6	
11	540	5.5	(215)	4.7	99	3.40		2.18	
12	505	5.6	210	4.8	99	3.40		2.35	
13	570	5.5	220	4.7	99	3.40		2.25	
14	520	5.4	(220)	4.7	101	3.30		(2.30)	
15	540	(5.4)	215	4.6	101	3.20		2.35	
16	520	5.6	220	4.5	101	3.20		2.40	
17	500	5.5	220	4.3	101	3.05		(2.40)	
18	460	5.6	220	4.1	101	2.95		2.50	
19	<465	(5.6)	220	4.1	104	2.00		(2.50)	
20	435	5.8	230	3.9	109	(2.70)		2.60	
21	(440)	(5.8)	255	(3.7)	109	(2.50)		(2.60)	
22	(450)	(6.0)	245	---	111	(2.35)		(2.70)	
23	(460)	6.0	250	---	112	(2.30)		2.68	

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 23

Cape Canaveral, Florida (28.4°N, 00.6°W)								July 1958	
Time	h°F2	foF2	h°F	foF1	h°E	foE	foEs	(M3000)F2	
00		7.1	(310)			3.6		2.60	
01		7.0	300			3.0		2.60	
02		6.6	205					2.65	
03		6.25	300					2.60	
04		6.0	(310)					2.60	
05		6.0	(305)					2.65	
06	---	6.2	<270	---	---	3.6		2.85	
07	---	7.2	240	---	111	2.85	4.6	2.90	
08	(460)	7.55	220	5.0	109	(3.45)	4.2	2.75	
09	435	7.75	<215	5.3	107	(3.80)	4.6	2.60	
10	440	8.25	(210)	5.5	107	(4.00)	4.5	2.55	
11	415	8.9	(210)	5.8	105	4.20	5.0	2.55	
12	420	8.8	(210)	5.7	105	4.20	5.2	2.50	
13	410	9.15	<215	5.6	107	4.25	4.6	2.55	
14	420	9.1	(215)	5.5	107	4.15	4.5	2.55	
15	410	8.95	(220)	5.5	109	4.05	4.4	2.58	
16	415	8.4	220	5.5	109	3.85	4.1	2.58	
17	<395	8.4	<230	5.0	111	3.40	3.8	2.65	
18	(400)	7.85	(240)	---	<114	2.92	3.3	2.65	
19		8.3	280	---	---	3.5		2.75	
20		7.8	(260)			3.0		2.65	
21		7.6	<285			2.55		2.21	
22		7.3	<300			3.2		2.60	
23		7.1	(310)			3.7		2.60	

Time: 75.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 24

Townsville, Australia (19.3°S, 146.7°E)								July 1958	
Time	h°F2	foF2	h°F	foF1	h°E	foE	foEs	(M3000)F2	
00			>5.1	250					(3.10)
01			>4.5	250					3.00
02			4.3	250					3.00
03			3.9	250					3.00
04			3.4	260					2.70
05			3.6	290					2.80
06			3.7	280					2.90
07			>7.0	250					(3.15)
08	---	>10.0	250	---	110	2.90			(3.20)
09	(250)	12.0	240	---	110	3.30			3.10
10	250	>12.0	225	---	110	3.60	3.7		3.05
11	(270)	11.8	220	---	110	3.80			2.90
12	(280)	11.5	215	---	110	3.80			2.90
13	---	11.2	210	---	110	3.80			2.85
14	(290)	10.9	230	6.4	110	3.70	4.0		2.85
15	---	>10.5	220	---	110	3.50	3.7		(2.75)
16	---	>10.5	240	---	110	3.20	3.5		(2.80)
17	---	>10.2	250	---	110	2.70	3.6		---
18	---	>9.5	250	---	110	2.70	3.6		---
19	---	>7.5	250	---	110	2.70	3.5		---
20	---	>6.5	250	---	110	2.70	3.5		1.8
21	---	>6.3	250	---	110	2.70	3.5		---
22	---	>6.4	250	---	110	2.70	3.5		---
23	---	>5.7	250	---	110	2.70	3.5		(2.95)

Time: 150.0°E.

Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.

Table 25

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		7.2						
01		7.2						
02		7.1						
03		7.0						
04		6.0						
05		6.8			1.7			
06		7.1			2.7			
07		8.0			---			
08		9.0			---			
09		8.5			---			
10		9.2			---			
11		9.3			---			
12		8.9			---			
13		9.1			4.2			
14		9.0			---			
15		8.7			---			
16		0.7			---			
17		8.6			---			
18		0.5			---			
19		(8.4)			---			
20		7.3			---			
21		6.9			---			
22		7.2			---			
23		7.4			---			

Time: Local.

Table 27

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		6.9						
01		7.0						
02		7.2						
03		6.9						
04		6.5						
05		6.6			---			
06		7.2			2.30			
07		7.6			2.90			
08		8.6			---			
09		9.0			---			
10		9.2			---			
11		9.4			4.20			
12		9.7			4.20			
13		10.2			4.10			
14		10.0			4.10			
15		9.7			3.95			
16		9.5			3.70			
17		9.4			---			
18		9.2			---			
19		8.5			---			
20		7.2			---			
21		6.9			---			
22		6.8			---			
23		6.9			---			

Time: Local.

Table 29

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00		7.2						
01		7.2						
02		7.2						
03		6.5						
04		6.6						
05		6.4						
06		6.5			1.85			
07		7.8			2.50			
08		(8.6)			3.20			
09		10.7			3.60			
10		11.0			3.80			
11		11.5			4.00			
12		12.6			4.10			
13		12.5			4.10			
14		12.0			3.90			
15		11.0			3.70			
16		11.0			3.50			
17		10.8			3.10			
18		10.1			2.30			
19		(9.1)			---			
20		(7.4)			---			
21		(7.0)			---			
22		7.0			---			
23		6.8			---			

Time: Local.

Table 26

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		0.0	230					2.90
01		7.9	220					2.95
02		7.65	225					2.90
03		6.9	230					2.95
04		5.7	235					3.00
05		5.15	250					3.00
06		4.65	250					2.90
07		6.6	290		<149	1.00		2.00
08		10.0	250		111	2.75		2.90
09		11.95	230		109	3.25		2.00
10		12.6	225		109	3.65	4.0	2.55
11		>12.1	220		109	3.90	5.0	(2.30)
12		(12.0)	215		109	4.00	5.0	(2.30)
13		(11.6)	215		105	4.9		(2.25)
14		11.4	210		107	5.2		2.25
15		10.0	220		109	3.70	5.1	2.20
16		10.3	235		109	3.40	5.2	2.20
17		10.4	260		111	(2.00)	4.9	2.20
18		9.6	290		<149	1.90	4.0	2.30
19		9.0	330					2.30
20		8.9	310					2.35
21		0.75	200					2.42
22		8.6	245					2.50
23		8.0	230					2.00

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 28

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		8.0	225					2.75
01		9.0	225					2.05
02		8.3	235					2.05
03		7.5	230					3.00
04		6.4	235					2.95
05		5.8	235					3.00
06		5.4	240					3.00
07		0.1	260		<151	2.00		2.75
08		11.6	245		111	2.05		2.00
09		(13.5)	235		109	3.40	3.8	(2.70)
10		(13.2)	225		107	5.0		(2.50)
11		>13.0	215		107	6.8		(2.30)
12		(12.8)	(210)		106	5.2		(2.25)
13		<220			109	6.3		(2.20)
14		(11.9)	(220)		107	6.7		(2.15)
15		>11.8	225		(109)	6.7		(2.20)
16		>11.0	245		108	5.2		(2.15)
17		(11.65)	260		111	2.82	5.2	(2.15)
18		(11.15)	300		<155	2.05	4.0	(2.25)
19		(10.5)	360					(2.22)
20		(9.9)	335					(2.15)
21		(10.05)	275					(2.30)
22		10.05	240				3.0	2.62
23		9.55	235				3.5	2.70

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 30

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		10.55	230					3.5
01		11.0	230					2.82
02		10.2	230					2.88
03		8.5	230					2.90
04		7.6	240					2.85
05		6.9	245					2.90
06		6.6	240		---	---	3.2	2.95
07		8.8	270		131	2.10	3.8	2.90
08		12.5	245		115	3.00	3.6	2.95
09		>14.8	235		111	3.50	5.0	2.80
10		16.0	225		109	(3.80)	5.5	(2.55)
11		(16.0)	220		110	7.0		---
12		>14.65	215		---	7.0		---
13		(13.8)	220		109	6.7		---
14		>13.0	220		109	7.0		(2.15)
15		>12.9	225		111	6.8		(2.20)
16		>13.0	245		109	6.9		(2.12)
17		>13.0	(260)		109	6.4		(2.20)
18		>12.0	285		117	2.15	5.2	(2.10)
19		(10.8)	370					(2.12)
20		(9.5)	380					(2.00)
21		(10.4)	290				2.5	(2.25)
22		10.6	250				3.2	2.60
23		10.65	240				3.5	(2.55)

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 31

La Paz, Bolivia (16.5°S, 68.0°W)							March 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		(11, 2)	235			4.4	(2, 80)	
01		10, 9	225			3.4	2, 95	
02		9, 0	230			3.9	2, 95	
03		7, 4	230			3.5	2, 80	
04		7, 1	240			3.2	2, 80	
05		7, 4	240			4.0	3, 00	
06		6, 95	245	---	---	3.7	2, 95	
07		10, 05	260	<130	2, 22	4.6	2, 90	
08		>13, 05	245	121	3, 15	5.2	2, 95	
09		14, 8	240	115	3, 60	5.3	2, 78	
10		>15, 8	230	111	---	6.5	(2, 50)	
11		(16, 0)	225	111	---	7.4	(2, 38)	
12		>13, 9	<225	109	---	7.0	(2, 25)	
13		(13, 0)	(215)	---	---	8.3	(2, 15)	
14		(12, 6)	(220)	111	---	8.2	(2, 10)	
15		(13, 0)	(240)	---	---	8.0	(2, 15)	
16		(13, 0)	<240	106	---	7.9	(2, 10)	
17		(12, 0)	(260)	110	---	8.0	(2, 10)	
18		(11, 6)	280	---	2, 60	6.8	(2, 12)	
19		>11, 25	325				(2, 10)	
20		>9, 85	385				(2, 10)	
21		(9, 8)	350				(2, 20)	
22		>10, 5	280			3.8	(2, 40)	
23		>11, 05	250			4.4	(2, 68)	

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 33

La Paz, Bolivia (16.5°S, 68.0°W)							January 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00		8, 9	450			3.2	(2, 25)	
01		9, 25	405			3.2	(2, 25)	
02		>9, 0	350			3.1	(2, 42)	
03		8, 7	305			3.4	2, 50	
04		8, 25	260			3.6	2, 70	
05		7, 15	230			3.0	2, 80	
06		7, 1	275	135	1, 62	3.9	2, 60	
07		9, 65	260	121	2, 60	4.8	2, 65	
08		11, 7	240	111	3, 30	6.9	2, 40	
09		12, 8	230	109	(3, 80)	7.4	2, 30	
10		>12, 8	220	109	(4, 10)	8.0	2, 10	
11		(13, 0)	215	7, 0	109	(4, 30)	8.2	(2, 00)
12	---	11, 9	210	7, 1	111	(4, 50)	8.1	(2, 00)
13	(590)	(11, 5)	210	6, 8	107	(4, 50)	8.2	(2, 00)
14	(550)	(11, 0)	205	6, 5	109	(4, 40)	7.4	(2, 00)
15	---	>12, 0	215	6, 4	107	(4, 20)	7.6	(2, 10)
16	---	12, 0	225	109	(3, 90)	7.3	2, 05	
17	---	>12, 05	240	109	(3, 60)	7.0	2, 05	
18	---	(12, 6)	265	111	(3, 00)	6.4	(2, 00)	
19		>11, 4	305	<149	2, 00	4.5	(1, 90)	
20		>9, 7	415				---	
21		>9, 0	(490)				---	
22		>8, 9	445			2.4	(1, 90)	
23		9, 0	455			2, 9	(2, 10)	

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 35

Alert, Canada (82.5°N, 62.6°W)							September 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00		6, 0	300	---	1.7	1.7		
01		5, 6	300	---	1.8			
02		5, 7	300	---	1.9	1.9		
03		6, 4	290	---	1.9			
04		7, 0	290	150	2.0			
05		6, 5	290	140	2.0			
06		6, 3	300	125	2.1			
07	---	6, 1	290	120	2.2			
08	---	6, 3	280	105	2.4			
09	---	6, 6	290	120	2.5			
10	---	6, 4	300	110	2.6			
11	(500)	6, 4	280	3, 8	120	2.6		
12	---	6, 4	290	---	110	2.6		
13	---	7, 0	290	---	110	2.5		
14	---	7, 0	300	3, 7	105	2.4		
15	---	7, 1	300	---	105	2.4		
16	---	6, 8	300	---	120	2.3		
17	---	7, 2	300	105	2.2			
18	---	7, 2	300	110	2.0			
19	---	6, 3	300	---	1.9			
20	---	6, 4	300	---	1.9			
21	---	6, 6	300	---	1.8			
22	---	6, 1	300	---	1.7	1.7		
23	---	5, 6	300	---	1.7	1.8		

Time: 75.0°W.

Sweep: 1.6 Mc to 20.0 Mc in 15 seconds.

Table 32

La Paz, Bolivia (16.5°S, 68.0°W)							February 1958	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			(11, 11)	305				(2, 78)
01			10, 5	280				(2, 65)
02			9, 35	<280				(2, 60)
03			9, 45	255				3, 0
04			8, 5	270				2, 70
05			7, 8	250				2, 2
06			7, 1	<245				4, 5
07			9, 4	265				2, 80
08			12, 0	240				(1, 20)
09			13, 5	230				2, 60
10			(12, 9)	215				(2, 30)
11			>13.5	210				(2, 10)
12			(12, 0)	<210				(2, 10)
13			(12, 2)	(205)				(2, 10)
14			12, 2	<210				(2, 15)
15			(11, 6)	(205)				(2, 12)
16			12, 7	<230				(2, 20)
17			13, 0	240				(2, 18)
18			(13, 0)	270				(2, 10)
19			>13, 0	290				(2, 10)
20			>12, 0	390				(1, 95)
21			(12, 2)	345				(2, 00)
22			>12, 2	335				3, 1
23			(11, 7)	300				(2, 35)

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 34

La Paz, Bolivia (16.5°S, 68.0°W)							December 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			8, 6	460				3, 0
01			8, 3	425				(2, 30)
02			8, 5	430				2, 35
03			8, 75	380				2, 58
04			8, 3	325				2, 68
05			7, 7	260				2, 65
06			7, 9	280				2, 70
07			10, 15	260				2, 65
08			11, 8	240				2, 45
09			12, 0	235				2, 35
10			13, 0	230				2, 25
11			605	13, 1	<225	6, 9	109	(4, 40)
12			605	13, 0	220	6, 6	111	(4, 50)
13			655	12, 9	220	6, 5	111	(4, 50)
14			625	12, 7	215	6, 2	(111)	(4, 40)
15			(650)	>12, 2	215	6, 0	(109)	(4, 20)
16			11, 0	230		109	(3, 90)	7, 6
17			11, 8	250		109	(3, 50)	6, 8
18			12, 0	275		111	(2, 90)	5, 4
19			>11, 1	325		116	1, 0	(2, 00)
20			10, 4	420				1, 95
21			>9, 4	460				
22			9, 3	475				2, 2
23			>9, 0	460				2, 2

Time: 60.0°W.

Sweep: 1.0 Mc to 25.0 Mc in 13.5 seconds.

Table 35

Cape Hallett (72.3°S, 170.3°E)							August 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	foEs	(M3000)F2
00			4, 1	290				<1, 2
01			3, 0	290				(2, 60)
02			3, 7	300				1, 6
03			3, 6	(305)				
04			3, 4	280				<1, 2
05			(4, 3)	290				<1, 2
06			4, 6	270				1, 5
07			5, 4	265				
08			5, 8	265				1, 7
09			6, 6	250				(2, 90)
10			6, 9	245				2, 0
11			7, 0	245				(3, 05)
12			7, 8</td					

Table 37								July 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	7.8								
01	7.5								
02	7.2								
03	7.0								
04	6.6								
05	6.4		1.8						
06	7.4		2.5						
07	8.0		3.1						
08	8.3		3.5						
09	8.4		3.7						
10	9.0		3.8						
11	9.0		3.9						
12	9.0		3.9						
13	9.1		3.9						
14	9.2		3.8						
15	8.9		3.8						
16	8.9		3.7						
17	8.3		3.5						
18	8.3		3.1						
19	8.6		2.5						
20	8.4								
21	(7.2)								
22	7.8								
23	(7.9)								

Time: 15.0°E.

Table 39								June 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	8.4								
01	8.2								
02	7.8								
03	7.4								
04	7.0								
05	7.1		2.0						
06	8.1		2.8						
07	8.5		3.2						
08	8.8		3.5						
09	8.6		3.7						
10	9.2		3.8						
11	9.2		3.9						
12	9.3		4.0						
13	8.8		3.9						
14	9.0		3.9						
15	8.8		3.8						
16	8.5		3.7						
17	8.4		3.5						
18	8.3		3.1						
19	8.1		2.5						
20	8.5								
21	8.0								
22	8.4								
23	8.5								

Time: 15.0°E.

Table 41								April 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00	7.7								
01	7.4								
02	7.3								
03	7.0								
04	6.8								
05	6.4								
06	7.0		2.1						
07	8.2		2.9						
08	9.2		3.3						
09	10.0		3.5						
10	10.6		3.6						
11	11.2		3.7						
12	11.8		3.8						
13	11.8		3.8						
14	11.8		3.7						
15	11.2		3.6						
16	10.8		3.4						
17	10.4		3.0						
18	10.4		2.3						
19	9.8								
20	8.9								
21	8.5								
22	8.2								
23	8.2								

Time: Local.

Table 38								July 1957	
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	
00			2.6	<320					2.70
01			2.4	<310					2.60
02			2.6	<320					2.75
03			2.7	<295					2.00
04			2.9	(260)					2.90
05			5.5	<245					3.28
06			7.9	230					3.35
07			9.3	225					3.25
08			(250)	10.7	225	---	3.1	3.2	3.15
09			(240)	11.9	230	---	3.3	3.6	3.10
10			---	12.3	230	---	3.3	3.8	3.00
11			(250)	12.3	235	---	3.2	3.8	3.00
12			---	11.8	230	---	3.5	3.05	
13				11.8	225	---			3.00
14				10.0	220	---			3.20
15				8.0	215			3.0	3.20
16				6.2	230			2.2	3.25
17				3.8	220				3.40
18				(2.2)	>270				(3.20)
19				(2.0)	<315				(2.90)
20				2.0	<320				2.60
21				2.0	<345				2.70
22				2.2	<310				2.60
23				2.3	<310				2.60

Time: 0.0°.
Sweep: 1.6 Mc to 20.0 Mc in 18 seconds.

Table 40								May 1957	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00			8.0						
01			7.9						
02			7.5						
03			7.4						
04			7.2						
05			7.4					1.6	
06			8.4					2.5	
07			8.8					3.1	
08			9.0					3.4	
09			9.0					3.6	
10			9.4					3.7	
11			9.8					3.8	
12			10.0					3.9	
13			9.8					3.9	
14			10.0					4.0	
15			10.0					3.8	
16			9.7					3.7	
17			9.5					3.4	
18			9.6					2.9	
19			9.2					2.2	
20			9.0						
21			8.4						
22			8.4						
23			8.2						

Time: 15.0°E.

Table 42								October 1956	
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	
00			(6.5)	320				2.2	(2.55)
01			6.2	300					2.50
02			5.8	300					2.50
03			5.3	300					2.50
04			5.0	300					2.55
05			5.3	300				1.75	2.70
06			6.5	260				2.15	2.05
07			7.0	250				2.85	2.80
08			7.6	(250)					2.80
09			7.6	---					2.60
10			>7.7	---					2.55
11			>7.7	---					2.55
12			>7.7	---					2.50
13			7.8	---					2.50
14			8.0	---					2.55
15			7.9	---					2.55
16			7.9	---					2.65
17			>7.7	(280)				2.50	2.65
18			7.9	(290)				2.00	2.75
19			8.0	270				E	2.55
20			(8.0)	260				---	2.6
21			(7.6)	300				3.2	(2.40)
22			7.0	310				3.6	2.40
23			(7.0)	320				3.0	(2.50)

Time: 157.5°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 43

September 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00			5.0	290			2.1	2.80
01			5.0	290			2.9	2.75
02			4.4	300			1.8	2.70
03			4.6	300			2.1	(2.80)
04			4.2	290				2.70
05			4.0	290				2.80
06			5.6	270				2.95
07			6.6	260			2.30	3.00
08			6.0	260				2.95
09			7.2	260				3.00
10			>7.7	(270)				2.90
11			>7.7	260				2.95
12			>7.7	270				2.90
13			8.0	260				2.80
14			8.2	270				2.90
15			8.3	(260)				3.00
16			>7.7	260			2.05	2.90
17			7.7	270			2.10	2.90
18			>7.6	260			<1.60	2.65
19			7.0	250				2.75
20			7.1	270				2.00
21			6.2	270				2.00
22			5.6	290			2.1	2.85
23			5.2	290			2.1	2.75

Time: 157.5°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 44

August 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00							3.9	290
01							3.7	290
02							3.0	300
03							3.0	290
04							3.7	290
05							3.1	270
06							2.9	260
07							4.7	260
08							6.1	250
09							6.9	250
10							>7.7	250
11							7.9	260
12							7.9	260
13							8.1	250
14							(8.0)	250
15							8.1	250
16							8.0	250
17							7.9	240
18							6.9	250
19							5.9	250
20							5.6	260
21							5.2	260
22							4.9	280
23							4.8	290

Time: 157.5°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 45

July 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00			---	360			2.6	----
01			---	350			4.1	----
02			---	320			4.5	----
03			---	270			4.2	----
04			---	230			4.2	----
05			5.7	220			2.5	(3.29)
06			6.6	250	150	1.50	4.2	3.11
07			---	8.6	230	115	2.60	4.8
08			(260)	9.8	220	---	3.20	5.0
09			(310)	10.2	210	5.6	117	3.60
10			(345)	10.5	210	5.5	115	3.85
11			(350)	10.2	210	5.7	116	4.00
12			395	10.0	200	5.7	117	4.00
13			400	10.8	205	5.8	117	3.90
14			400	11.0	215	5.6	117	3.70
15			400	12.4	230	115	3.00	7.0
16			400	(10.5)	270	122	4.7	(2.52)
17			400	(8.4)	320	4.6	(2.18)	2.36
18			400	(9.0)	360	2.0	(2.40)	2.36
19			380	380		2.1	----	2.36
20			380	380		2.6	----	2.36
21			370	370		3.5	----	2.36

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 46*

July 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00			<270				3.4	2.9
01			(260)				3.0	2.9
02			260				3.4	2.85
03			240				5.7	3.2
04			240				7.2	3.2
05			240				120	2.4
06			240				120	2.4
07			240				120	2.4
08			240				120	2.4
09			240				120	2.4
10			240				120	2.4
11			240				120	2.4
12			240				120	2.4
13			240				120	2.4
14			240				120	2.4
15			240				120	2.4
16			230				120	2.4
17			240				120	2.4
18			240				120	2.4
19			270				120	2.4
20			260				120	2.4
21			<290				4.1	2.7
22			<290				4.2	2.7
23			<300				3.8	2.8

Time: 165.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 5 minutes, manual operation.

Observations taken on a 19-hour working schedule.

Table 48

June 1956

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00			6.3	370				3.4
01			5.6	350				4.5
02			5.2	335				3.6
03			4.8	325				3.4
04			4.8	300				2.65
05			5.2	270				3.8
06			6.8	260	1.75	2.0	3.2	3.11
07			260	8.1	240	(4.05)	114	2.80
08			280	8.6	220	4.60	111	3.25
09			310	9.4	215	5.10	111	3.55
10			380	10.3	210	5.30	109	3.75
11			425	11.1	210	5.55	109	3.95
12			430	12.0	210	5.60	109	4.00
13			430	12.7	210	5.55	109	4.00
14			405	12.9	210	5.45	109	3.80
15			410	13.0	220	5.25	111	3.60
16			385	12.7	230	4.90	111	3.30
17			370	12.4	240	4.40	113	2.80
18			---	12.0	270	----	121	2.10
19			11.0	300				4.6
20			9.2	390				4.3
21			7.7	410				2.7
22			6.8	400				2.9
23			6.5	380				3.6

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Time: 157.5°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 49

Djibouti, French Somaliland (11.5°N, 43.1°E)	June 1956							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00	---	380			2.7	---		
01	---	365			3.3			
02	---	330			3.7	---		
03	---	280			3.9	---		
04	(5.9)	240			2.6	---		
05	6.0	225			3.4	3.17		
06	---	7.3	250	---	125	1.70	4.1	3.10
07	---	9.0	230	---	117	2.65	5.5	3.00
08	(290)	10.0	220	---	112	3.20	6.8	2.78
09	(310)	10.4	215	5.60	115	3.60	7.0	2.57
10	335	10.2	210	5.65	113	3.80	9.6	2.39
11	375	10.4	210	5.80	112	3.90	10.0	2.33
12	395	10.6	205	6.00	115	4.00	10.0	2.27
13	385	10.7	210	5.70	115	3.95	10.0	2.30
14	380	11.3	205	6.00	115	3.80	10.0	2.32
15	380	11.3	210	5.85	116	3.60	6.2	2.48
16	370	12.1	220	5.85	119	3.35	6.6	2.45
17	380	12.4	230	---	119	2.80	6.2	2.52
18	(400)	12.6	260	---	123	2.05	4.6	2.56
19	10.5	310				2.4	2.42	
20	9.5	340				2.0	2.38	
21	(8.4)	380				2.2	(2.29)	
22	---	385				2.4	---	
23	---	375				2.4	---	

Time: Local time.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 51*

Campbell I. (52.5°S, 169.2°E)	June 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05	250	3.7				2.8		
06	<260	3.6				2.8		
07	250	3.7				2.8		
08	240	5.4			110	2.0		3.2
09	230	7.1	230	2.9	105	2.2		3.4
10	240	8.2	230	3.2	110	2.6		3.3
11	240	9.1	240	3.5	110	2.8		3.2
12	240	9.4	230	3.4	120	2.7		3.25
13	240	9.2	230	3.4	120	2.6		3.2
14	230	9.2	230	3.2	120	2.4		3.2
15	220	8.9			110	2.0		3.2
16	230	7.8				3.1		
17	240	6.4				3.0		
18	250	5.3				2.8		
19	<270	4.9				2.7		
20	<290	4.8				2.7		
21	<300	4.2				2.6		
22	<300	4.1				2.6		
23	300	3.4				2.65		

Time: 165.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 5 minutes, manual operation.

*Observations taken on a 19-hour working schedule.

Table 53

Oakar, French W. Africa (14.7°N, 17.4°W)	May 1956							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00	8.0	325				3.2	2.72	
01	8.0	290				3.3	2.81	
02	6.8	280				3.2	2.75	
03	7.2	270				2.4	2.78	
04	6.6	260				3.0	2.84	
05	5.8	250				3.4	2.79	
06	7.2	255			1.90	4.4	3.10	
07	8.6	240	---		113	2.80	4.8	3.06
08	275	10.0	230	4.50	111	3.35	4.8	2.88
09	330	10.6	220	4.90	111	3.65	4.0	2.70
10	355	11.7	215	5.20	111	3.90	4.2	2.61
11	390	12.8	210	5.30	109	4.00	4.5	2.62
12	410	13.2	210	5.35	109	4.00		2.62
13	410	13.4	210	5.25	109	4.00	4.3	2.56
14	410	13.5	215	5.20	109	3.85		2.56
15	405	13.4	220	5.00	111	3.65	4.0	2.62
16	390	13.2	230	4.60	111	3.30	4.0	2.64
17	380	12.6	250	(4.20)	113	2.75	3.2	2.68
18	380	12.2	265		1.85	4.1		2.68
19		11.6	310			3.5	2.44	
20		11.2	395			2.8	2.32	
21		9.6	400			2.4	2.38	
22		9.0	375			2.48		
23		8.4	350			3.0	2.58	

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 50

Tananarive, Madagascar (18.9°S, 47.6°E)	June 1956							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00			2.8	320				2.97
01			2.6	275				3.04
02			2.6	---				2.92
03			2.5	---				2.98
04			2.4	---				2.76
05			2.5	---				2.92
06			2.8	---				2.92
07			(6.6)	240			2.15 2.6	3.23
08			(260)	9.2	240		114 2.75	3.14
09			265	10.2	230	(5.10)	111 3.20	3.17
10			265	10.3	230	5.10	111 3.45	3.13
11			280	>10.0	(225)	(5.15)	109 3.55	3.07
12			280	9.8	(220)	5.10	109 3.70	3.02
13			285	9.6	(215)	5.15	109 (3.55)	2.98
14			280	9.6	(230)	5.15	109 3.45	3.00
15			270	8.9	235	---	113 3.30	2.92
16			270	9.0	240	---	119 3.00	2.99
17			---	9.2	240	---	2.20 3.1	3.06
18				8.2	225	---	3.1	3.16
19				5.0	220	---	2.9	3.19
20				3.7	240	---	2.9	3.00
21				4.0	250	---	2.8	3.12
22				3.8	240	---	1.8	3.20
23				3.3	245	---	1.9	3.20

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 51*

Campbell I. (52.5°S, 169.2°E)	June 1956							
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05	250	3.7				2.8		
06	<260	3.6				2.8		
07	250	3.7				2.8		
08	240	5.4			110	2.0		3.2
09	230	7.1	230	2.9	105	2.2		3.4
10	240	8.2	230	3.2	110	2.6		3.3
11	240	9.1	240	3.5	110	2.8		3.2
12	240	9.4	230	3.4	120	2.7		3.25
13	240	9.2	230	3.4	120	2.6		3.2
14	230	9.2	230	3.2	120	2.4		3.2
15	220	8.9			110	2.0		3.1
16	230	7.8				3.0		
17	240	6.4				3.0		
18	250	5.3				2.8		
19	<270	4.9				2.8		
20	<290	4.8				2.7		
21	<300	4.2				2.6		
22	<300	4.1				2.6		
23	300	3.4				2.65		

Time: 165.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 5 minutes, manual operation.

*Observations taken on a 19-hour working schedule.

Table 53

Oakar, French W. Africa (14.7°N, 17.4°W)	May 1956							
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00	8.0	325				3.2	2.72	
01	8.0	290				3.3	2.81	
02	6.8	280				3.2	2.75	
03	7.2	270				2.4	2.78	
04	6.6	260				3.0	2.84	
05	5.8	250				3.4	2.79	
06	7.2	255			1.90	4.4	3.10	
07	8.6	240	---		113	2.80	4.8	3.06
08	275	10.0	230	4.50	111	3.35	4.8	2.88
09	330	10.6	220	4.90	111	3.65	4.0	2.70
10	355	11.7	215	5.20	111	3.90	4.2	2.61
11	390	12.8	210	5.30	109	4.00	4.5	2.62
12	410	1						

Table 55

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	May 1956
00			3.3	270		1.4		2.91	
01			3.1	300				2.87	
02			3.1	(230)				2.93	
03			2.9	230				2.97	
04			2.7	---				2.78	
05			2.8	---		---	---	2.88	
06			3.5	280		---	---	2.90	
07			8.4	240		121	2.25	3.0	3.24
08	255	10.8	240	---	115	2.90		3.21	
09	260	(11.0)	230	5.10	111	3.35		3.18	
10	260	>11.0	230	5.20	109	>3.60		<3.13	
11	265	(11.0)	220	5.15	109	3.80		(3.06)	
12	270	10.8	220	5.20	109	3.90		3.01	
13	270	10.9	225	5.25	109	3.85		3.00	
14	260	10.7	225	5.10	109	3.65		2.92	
15	275	10.6	230	5.20	111	3.40		2.90	
16	(260)	>10.5	235		119	3.00		<2.90	
17		10.5	240			2.40	3.1	3.00	
18		10.0	230				3.1	3.05	
19		7.5	220				3.0	3.04	
20		6.3	240				2.9	3.06	
21		5.8	250				2.9	3.06	
22		4.6	240				2.6	3.24	
23		3.6	240				1.3	3.11	

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 57

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	April 1956
00			12.6	290				3.03	
01			11.4	260			3.3	3.13	
02			9.0	230			3.3	3.09	
03			7.4	230			3.2	2.94	
04			6.3	240			3.4	2.84	
05			5.5	250			3.3	2.69	
06			7.0	270		119	1.80	3.8	2.96
07			9.8	250	---	111	2.70	4.7	3.04
08	270	11.8	230	4.40	111	3.30	4.8	2.93	
09	330	12.7	220	4.90	111	3.70	4.8	2.79	
10	350	13.7	220	5.20	109	3.90	4.5	2.78	
11	360	14.5	210	5.30	109	4.10	4.1	2.68	
12	380	15.0	205	5.40	109	4.15		2.66	
13	400	14.7	210	5.30	109	4.00		2.61	
14	400	14.6	210	5.20	109	3.90		2.63	
15	390	14.9	220	5.00	111	3.70		2.63	
16	380	14.6	230	4.50	111	3.30	3.7	2.66	
17	390	13.6	250	(4.10)	113	2.70	4.7	2.59	
18	440	13.0	270			1.85	3.2	2.50	
19		12.5	340					2.39	
20		12.2	405					2.34	
21		11.8	390					2.41	
22		12.3	350					2.60	
23		12.4	325					2.82	

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 59

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	April 1956
00			5.8	230			2.2	3.10	
01			5.5	250			2.8	2.95	
02			4.9	(230)			2.9	3.00	
03			4.1	240			2.7	2.90	
04			3.6	270			2.8	2.80	
05			3.6	280			>2.0	2.80	
06			5.0	260	---	---	2.9	3.00	
07			9.4	235			2.50	3.25	
08	260	10.8	230	---	---	3.00	3.0	(3.10)	
09	255	(11.2)	(230)	---	---	3.40	3.4	---	
10	(250)	(11.5)	(220)	5.20	105	3.70		(3.10)	
11	(270)	>11.0	(225)	(5.35)	104	3.80		(3.00)	
12	(300)	>11.0	210	(5.50)	103	>3.90		(2.90)	
13	(280)	11.2	(220)	5.85	103	3.90		(3.00)	
14	---	11.3	220	---	104	3.75		3.00	
15	---	>11.0	230	---	104	3.55		<3.00	
16		11.2	230	---	106	3.10	3.2	(2.95)	
17		11.0	240	---	---	2.55	2.8	2.95	
18		10.8	235	---	(1.75)	3.2		3.00	
19		10.4	230			3.1		3.00	
20		9.3	230			2.9		3.00	
21		8.6	235			2.0		3.10	
22		7.4	230			2.8		3.20	
23		6.4	230			2.5		3.15	

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 56

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	May 1956
00								4.4	280
01								4.4	320
02								4.4	300
03								4.7	290
04								3.6	280
05								3.6	260
06								3.6	250
07								4.1	250
08								5.3	250
09								6.6	250
10								7.7	250
11								8.8	250
12								9.0	250
13								9.3	250
14								>9.2	250
15								8.8	250
16								8.5	240
17								8.4	240
18								6.2	250
19								>5.3	260
20								>6.0	280
21								(4.6)	270
22								>4.8	280
23								(4.8)	300

Time: 157.5°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 58

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	April 1956
00								9.7	275
01								(9.7)	260
02								9.6	240
03								9.0	230
04								7.8	230
05								6.6	230
06								7.0	260
07								10.2	250
08								260	121
09								13.0	220
10								>12.4	220
11								12.2	210
12								12.2	210
13								12.6	215
14								13.4	210
15								(420)	13.4
16								(390)	13.7
17								13.5	250
18								18.7	280
19								>10.2	370
20								>10.0	390
21								(10.7)	370
22								(11.6)	330
23								10.1	300

Time: Local.

Sweep: 1.25 Mc to 20.0 Mc in 10 minutes, automatic operation.

Table 60

Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2	April 1956
00								(5, 4)	(340)
01								5.4	(340)
02								(4.6)	(300)
03								4.5	(340)
04								4.0	300
05								4.1	300
06								4.0	300
07								5.4	280
08								6.6	250
09								7.6	250
10								(300)	>7.7
11								8.3	250
12								>9.9	250
13								8.8	250
14								>9.9	250
15								8.8	250
16								>7.7	260
17								7.7	260
18								6.5	280
19								>6.7	(250)
20								5.7	(280)
21								(5.2)	(300)
22								4.4	---
23								4.7	---

Time: 157.5°E.

Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 67*

Campbell I. (52.5°S, 169.2°E)							November 1955	
Time	h'F2	foF2	h'F	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05	270	4.6	240	---	130	2.3		3.0
06	290	5.2	250	3.6	125	2.7		2.95
07	330	5.6	240	4.2	120	2.9		3.0
08	350	6.0	240	4.6	120	3.1		2.9
09	350	6.2	230	4.7	120	3.3		2.9
10	340	6.6	230	4.8	120	3.4		2.9
11	350	6.8	230	5.0	120	3.6		2.9
12	350	6.9	230	4.9	120	3.6		2.9
13	340	7.0	230	4.8	120	3.5		2.9
14	340	7.0	230	4.7	120	3.3		2.85
15	340	7.0	230	4.5	120	3.2		2.9
16	330	7.1	240	4.3	125	2.9		2.8
17	310	6.9	250	3.9	130	2.6		2.9
18	290	7.0	240	3.5	135	2.4		2.9
19	270	7.1						2.9
20	270	7.0						2.8
21	280	6.2						2.8
22	290	5.8						2.8
23	300	4.8						2.8

Time: 165.0°E.

Sweep: 1.0 Mc to 15.0 Mc in 5 minutes, manual operation.

*Observations taken on a 19-hour working schedule.

Table 69

Madras, India (13.0°N, 80.2°E)							October 1955	
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04								
05								
06	300	7.4						3.10
07	320	>8.8						3.00
08	400	10.2						2.55
09	410	>10.0						(2.60)
10	440	>9.5						2.50
11	440	>9.2						2.50
12	460	9.3						2.40
13	440	>9.6						2.50
14	440	10.4						2.50
15	440	11.5						2.50
16	(440)	11.6						(2.50)
17	---	>11.6						----
18	(400)	>11.2						(2.60)
19	400	>10.1						2.60
20	(380)	>9.5						(2.70)
21	(360)	>9.0						(2.80)
22	---	(8.8)						----
23								

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

*Height at 0.83 foF2.

Table 71

Kodaikanal, India (10.2°N, 77.5°E)							October 1955	
Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	230	8.8						3.3
01	220	8.7						3.4
02	220	6.8						3.4
03	220	5.2						3.5
04	230	3.9						3.5
05	225	3.6						3.5
06	240	5.9						3.4
07	250	8.8	220	---	110	2.6		3.3
08	275	10.1	200	---	105	3.1	8.6	3.0
09	290	10.5	200	---	---	10.0		2.7
10	300	10.1	190	---	---	11.0		2.5
11	310	9.4	180	---	---	11.0		2.5
12	320	9.4	190	---	---	11.3		2.5
13	305	9.8	200	---	105	---	11.0	2.6
14	300	10.5	200	---	105	---	9.8	2.6
15	(290)	10.8	200	---	105	3.1	9.0	2.6
16	220	11.2	220	---	110	---	8.0	2.7
17	245	11.3		---	---			2.6
18	290	10.6						2.5
19	320	9.5						2.5
20	320	9.9						(2.6)
21	280	(10.4)						(2.9)
22	240	(10.4)						3.05
23	240	9.6						3.2

Time: 75.0°E.

Sweep: 1.0 Mc to 25.0 Mc in 27 seconds.

Table 68

Bombay, India (19.0°N, 73.0°E)									October 1955
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00									
01									
02									
03									
04									
05									
06	270	4.8							3.35
07	300	6.0							3.10
08	330	7.4							2.95
09	360	8.2							2.80
10	380	9.2							2.70
11	390	10.8							2.65
12	420	11.2							2.55
13	420	11.0							2.55
14	450	11.2							2.45
15	420	11.1							2.55
16	390	10.7							2.65
17	390	9.6							2.65
18	360	9.6							2.80
19	360	9.0							2.80
20	330	7.5							2.95
21	300	6.0							3.10
22	270	5.2							3.35
23									

Time: 75.0°E.

Sweep: 1.5 Mc to 18.0 Mc in 5 minutes, manual operation.

*Height at 0.83 foF2.

Table 70

Tiruchy, India (10.8°N, 78.8°E)									October 1955
Time	*	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2	
00									
01									
02									
03									
04									
05									
06	280	6.5							3.25
07	320	9.0							3.00
08	360	9.7							2.80
09	400	9.8							2.60
10	440	9.8							2.50
11	440	9.3							2.50
12	440	9.4							2.50
13	440	9.6							2.50
14	440	10.4							2.50
15	440	10.5							2.50
16	400	10.7							2.60
17	400	10.6							2.60
18	400	10.0							2.60
19	400	9.5							2.60
20	390	9.0							2.4
21	395	10.2							2.4
22	370	10.8							2.4
23	380	11.5							2.4
24	360	12.2							2.4
25	330	13.2							2.6
26	300	13.3							<2.7
27	250	13.0							2.8
28	250	12.0							2.3
29	235	11.6							2.7
30	225	10.9							2.8
31	215	10.0							3.0
32	210	8.6							3.05
33	220	5.4							2.7

Time: 0.0°.

Sweep: 1.0 Mc to 20.0 Mc in 7 seconds.

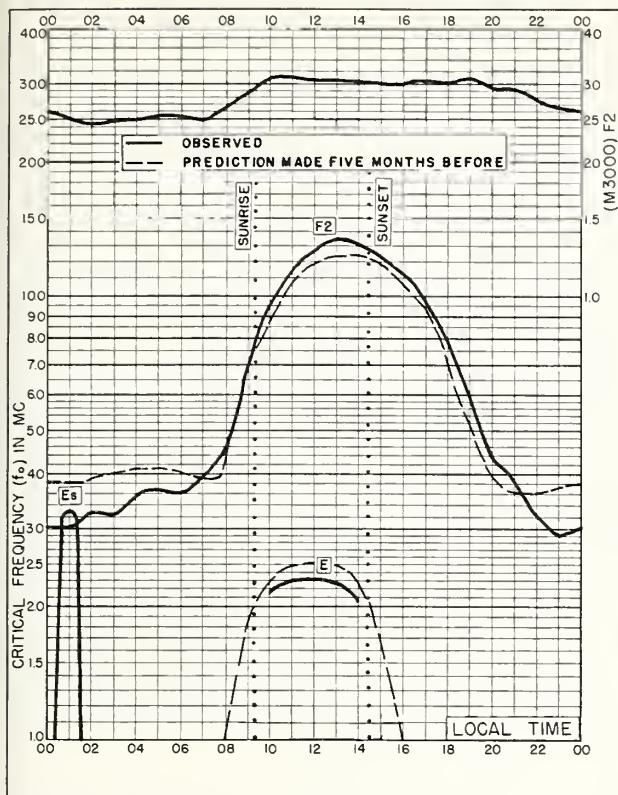


Fig. 1. ANCHORAGE, ALASKA
61.2°N, 149.9°W DECEMBER 1958

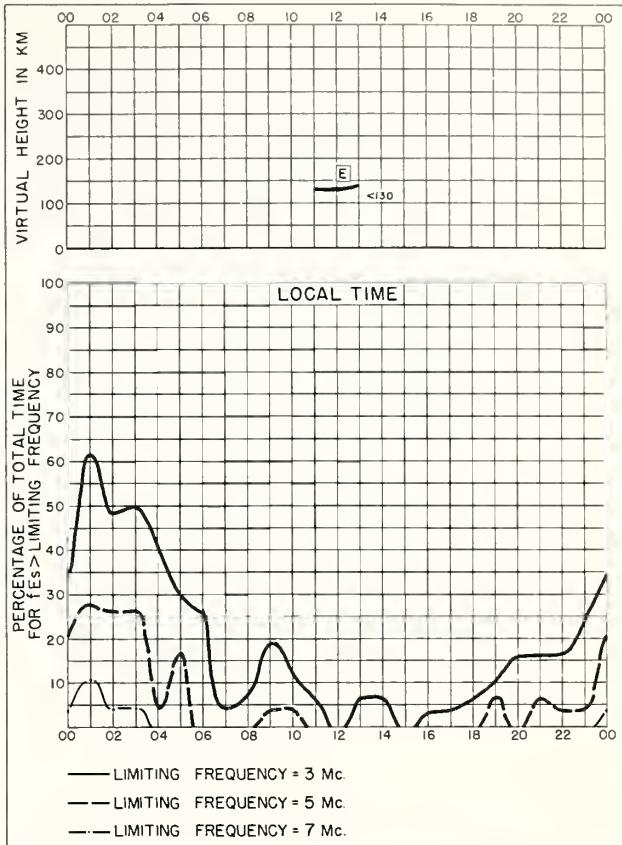


Fig. 2. ANCHORAGE, ALASKA DECEMBER 1958

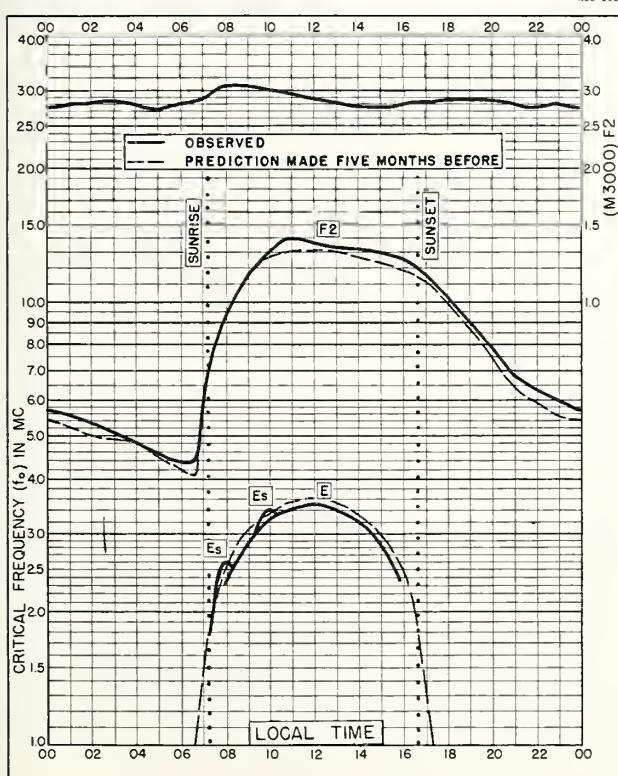


Fig. 3. WASHINGTON, D. C.
38.7°N, 77.1°W DECEMBER 1958

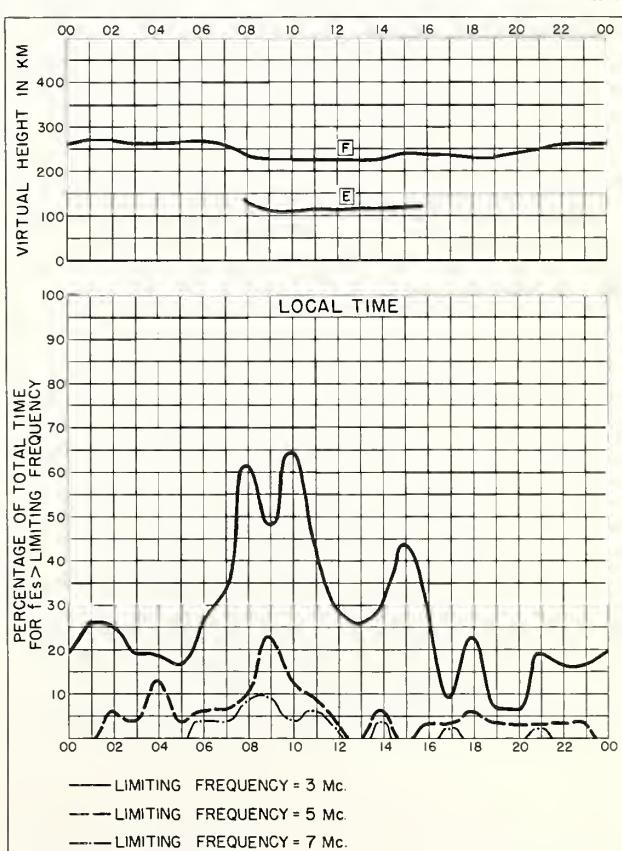
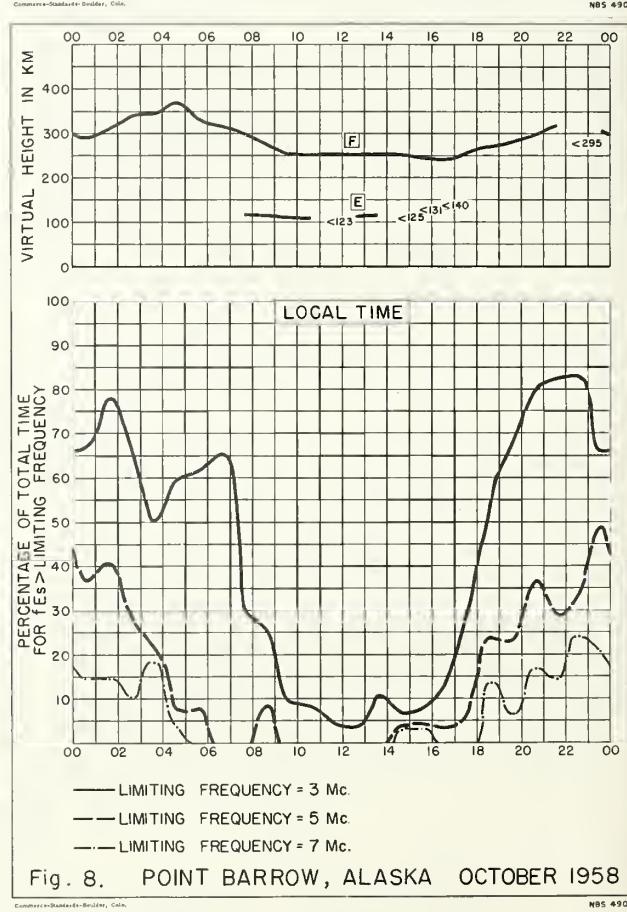
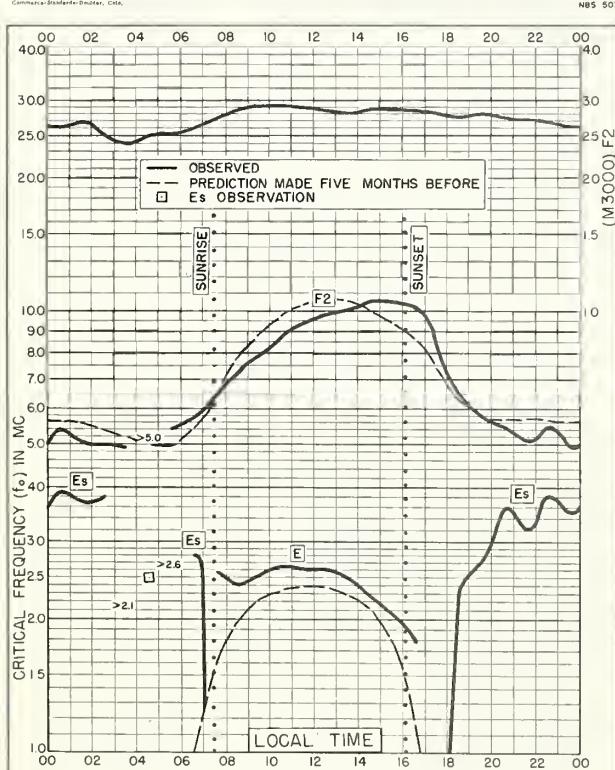
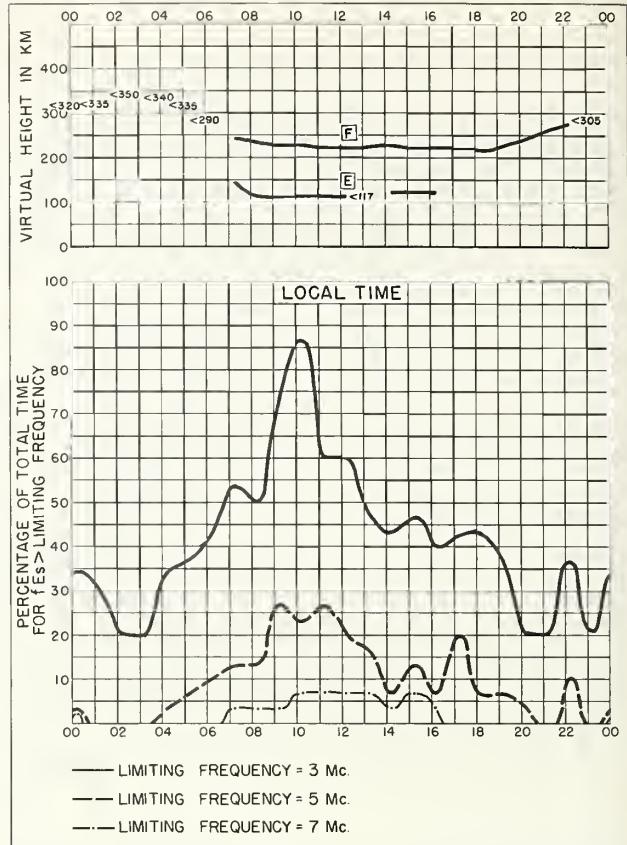
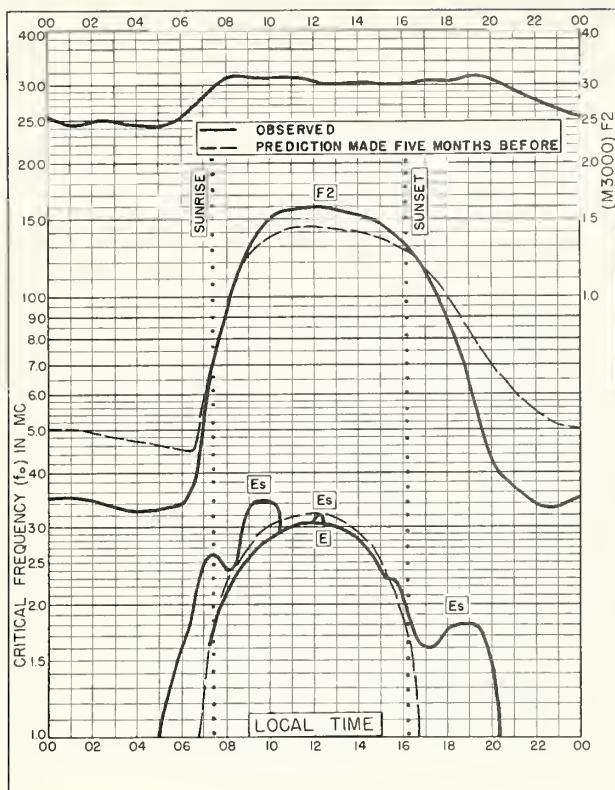
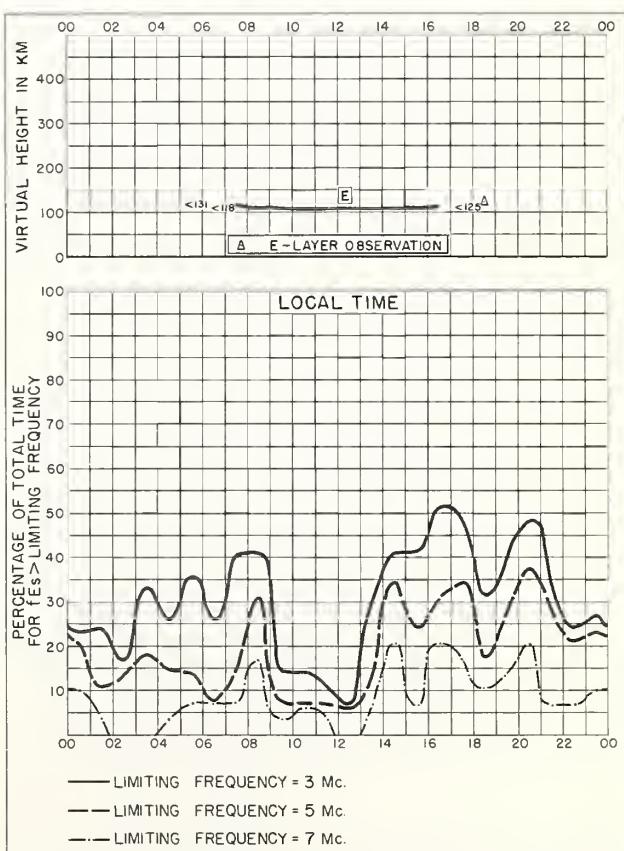
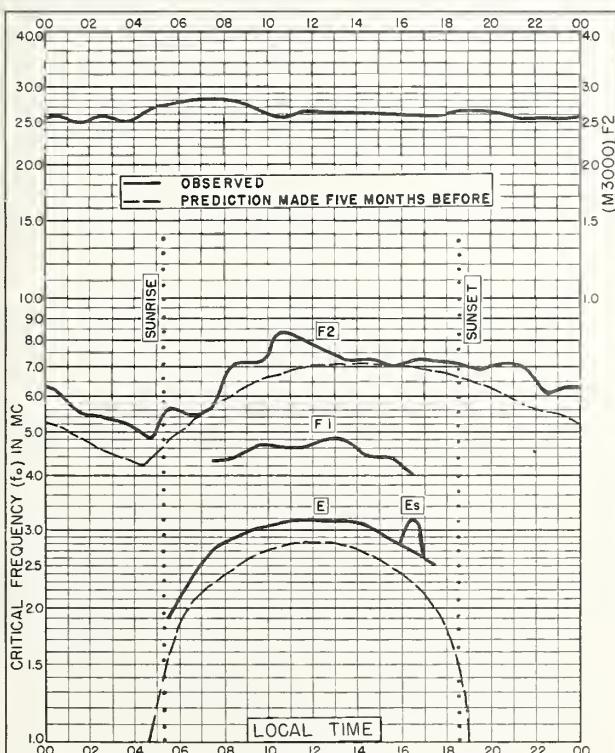
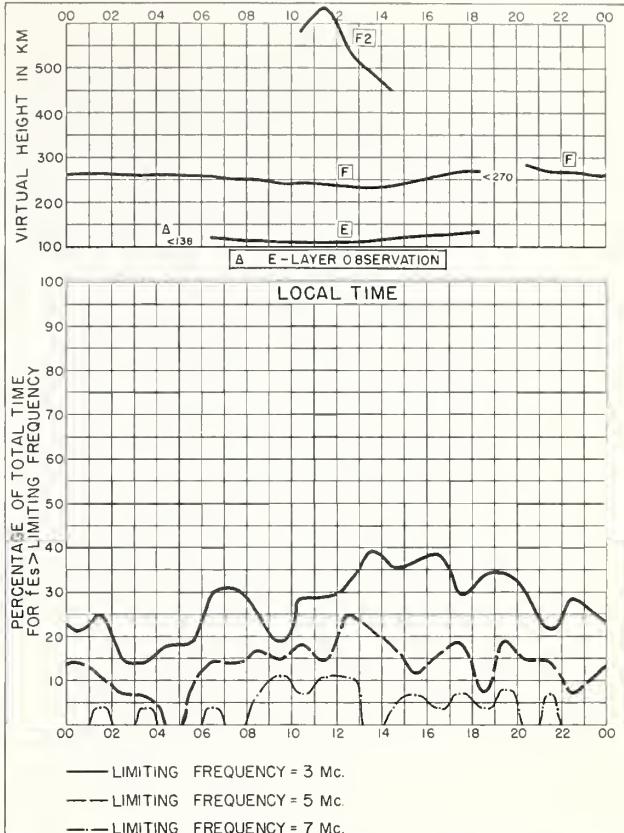
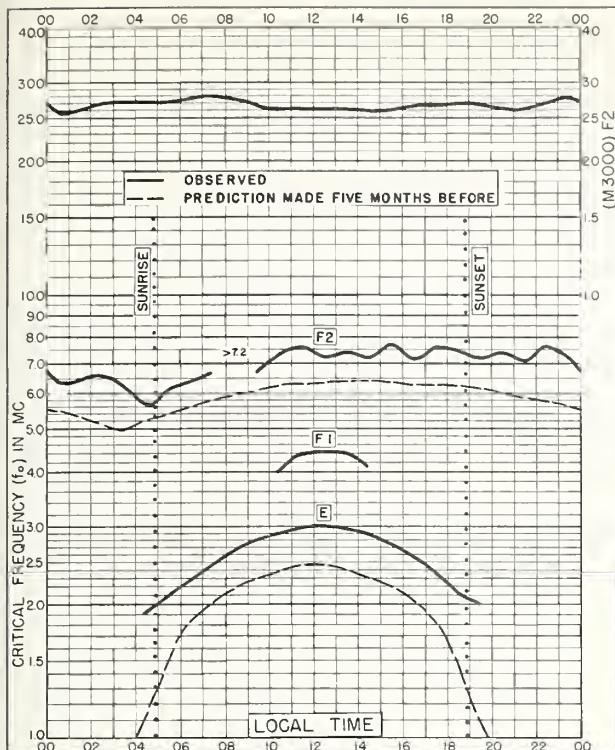


Fig. 4. WASHINGTON, D. C. DECEMBER 1958





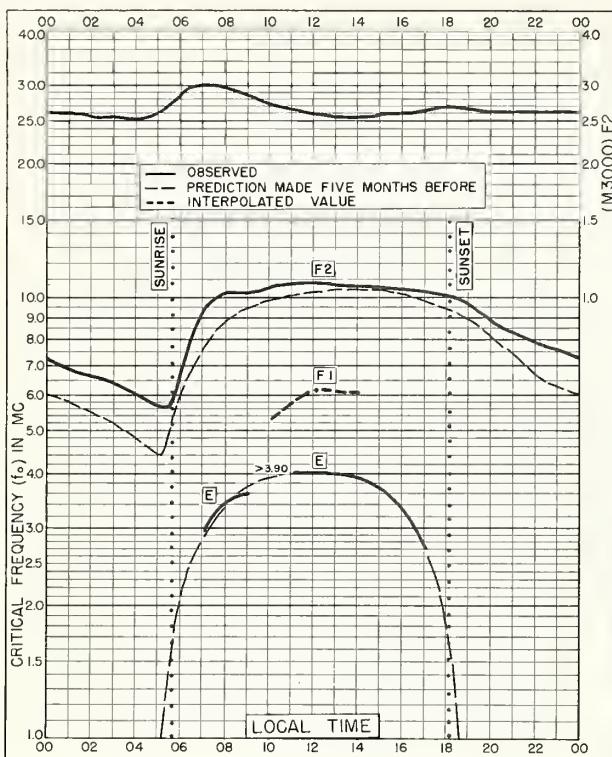


Fig. 13. FT. MONMOUTH, NEW JERSEY
40.4°N, 74.1°W SEPTEMBER 1958

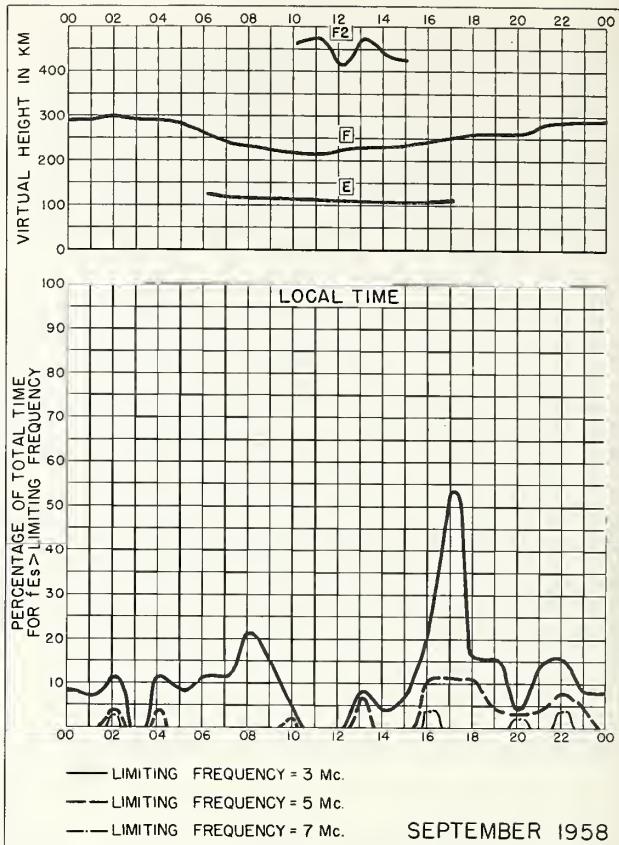


Fig. 14. FT. MONMOUTH, NEW JERSEY SEPTEMBER 1958

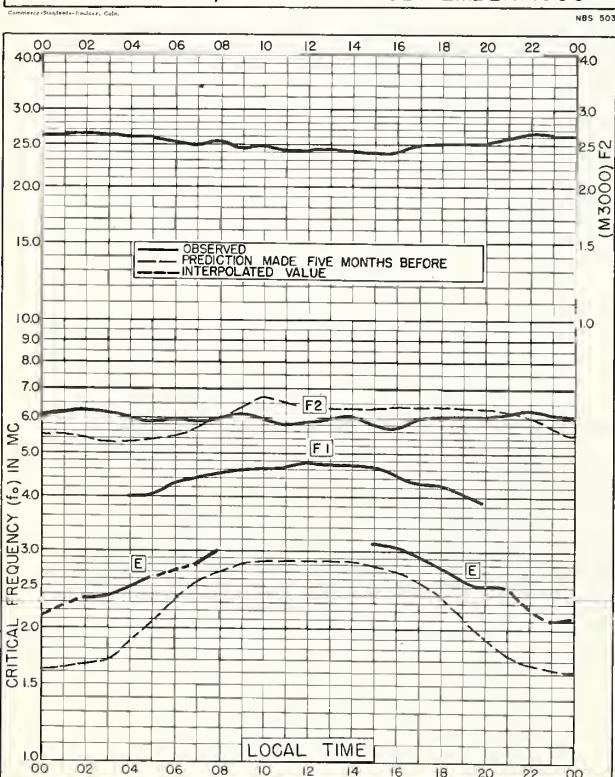


Fig. 15. FLETCHERS ICE I.
79.0°N, 122.0°W AUGUST 1958

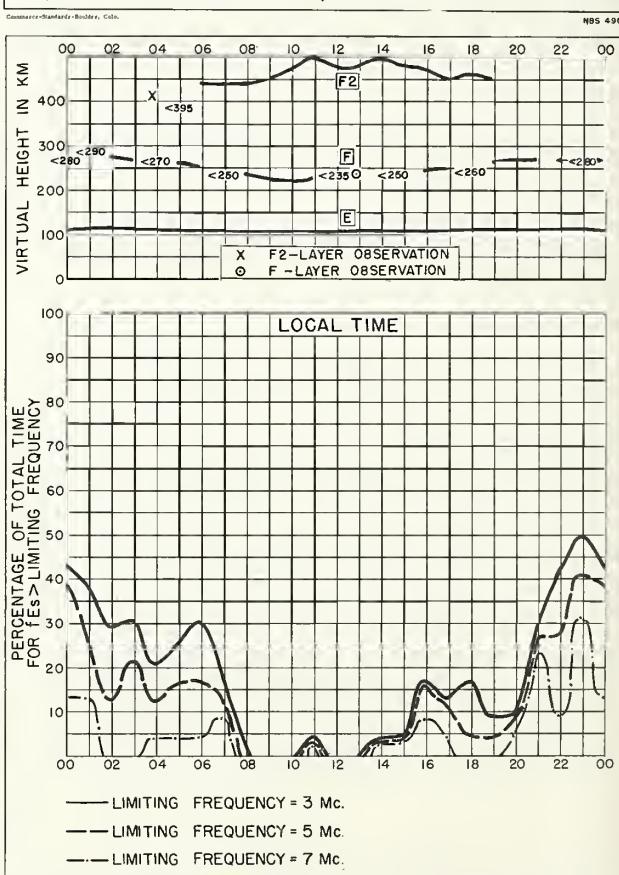


Fig. 16. FLETCHERS ICE I. AUGUST 1958

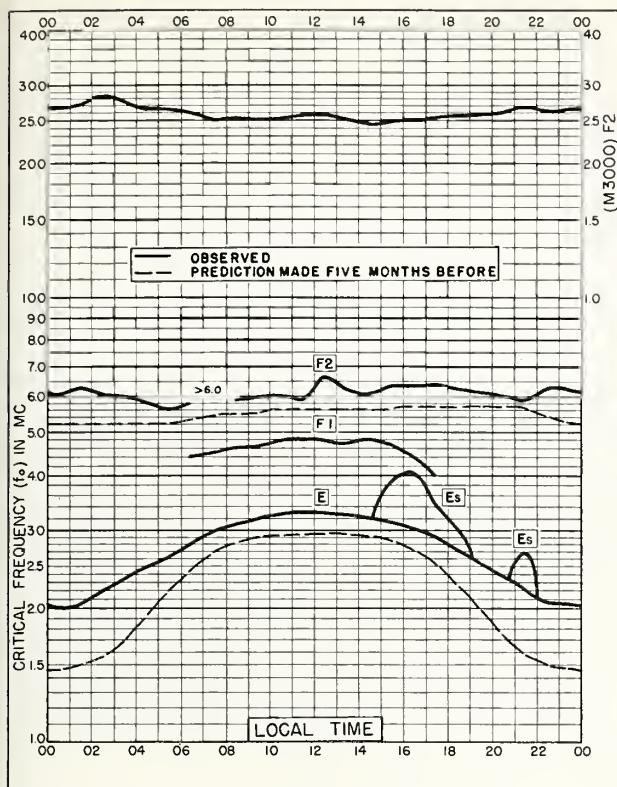


Fig. 17. THULE, GREENLAND
76.6°N, 68.7°W AUGUST 1958

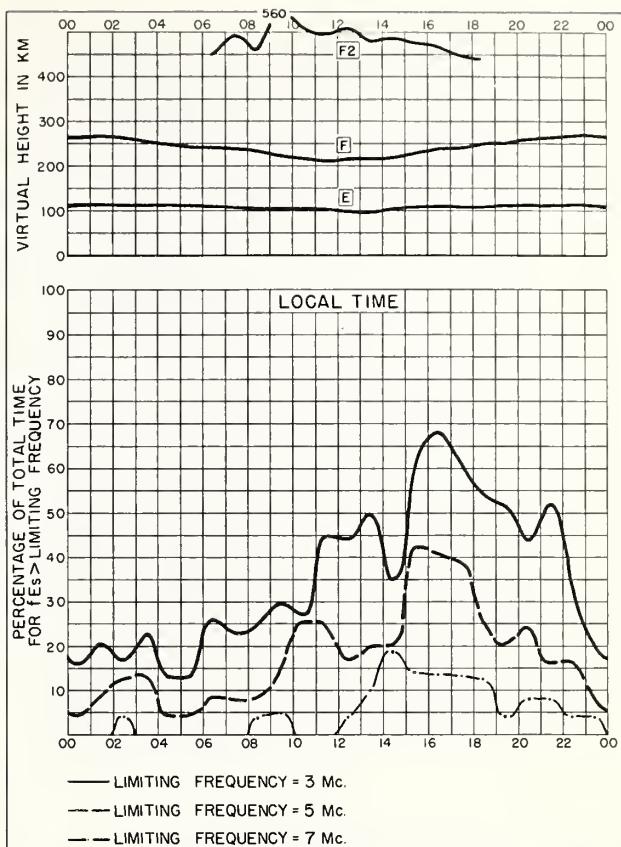


Fig. 18. THULE, GREENLAND AUGUST 1958

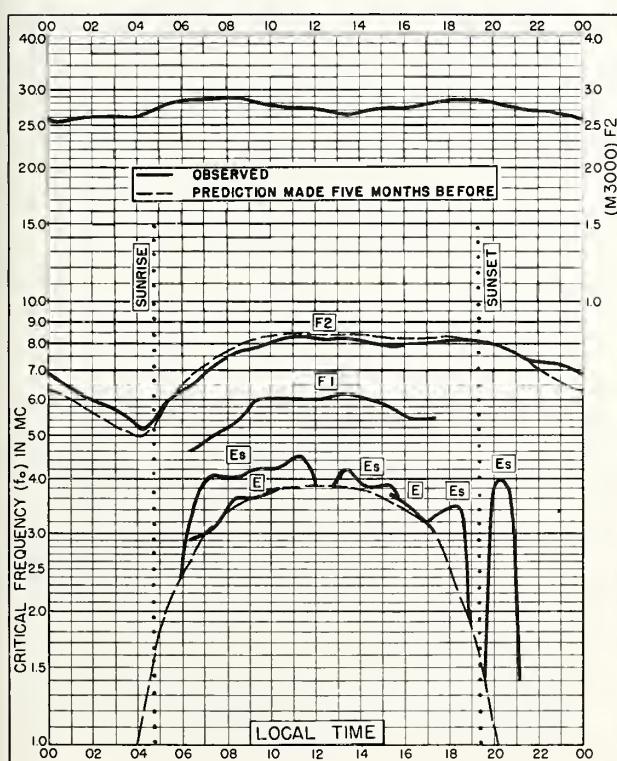


Fig. 19. De BILT, HOLLAND
52.1°N, 5.2°E AUGUST 1958

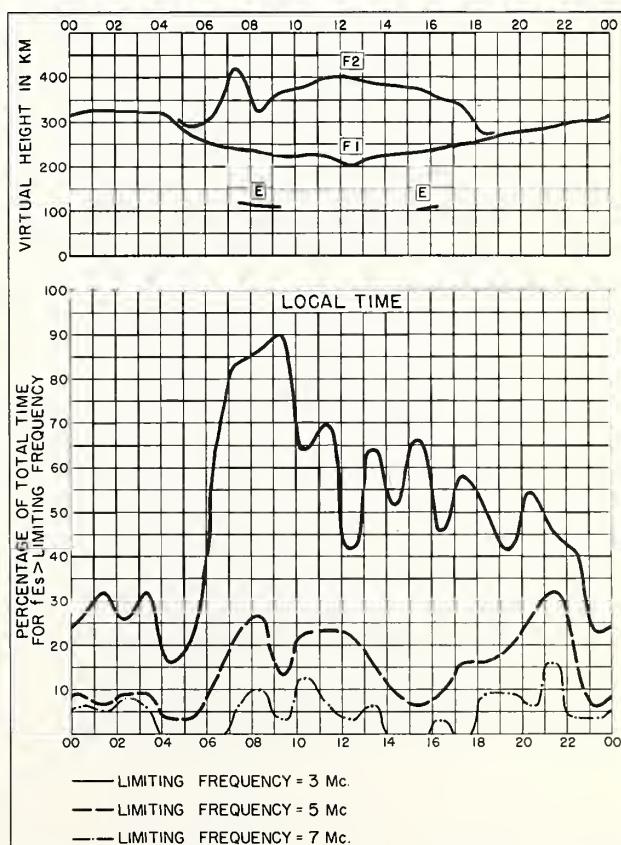


Fig. 20. De BILT, HOLLAND AUGUST 1958

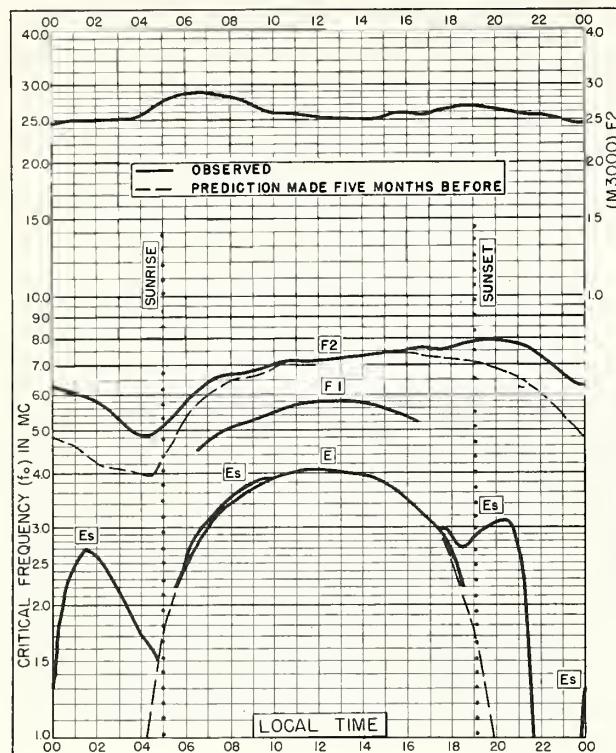


Fig. 21. ST. JOHN'S, NEWFOUNDLAND
47.6°N, 52.7°W AUGUST 1958

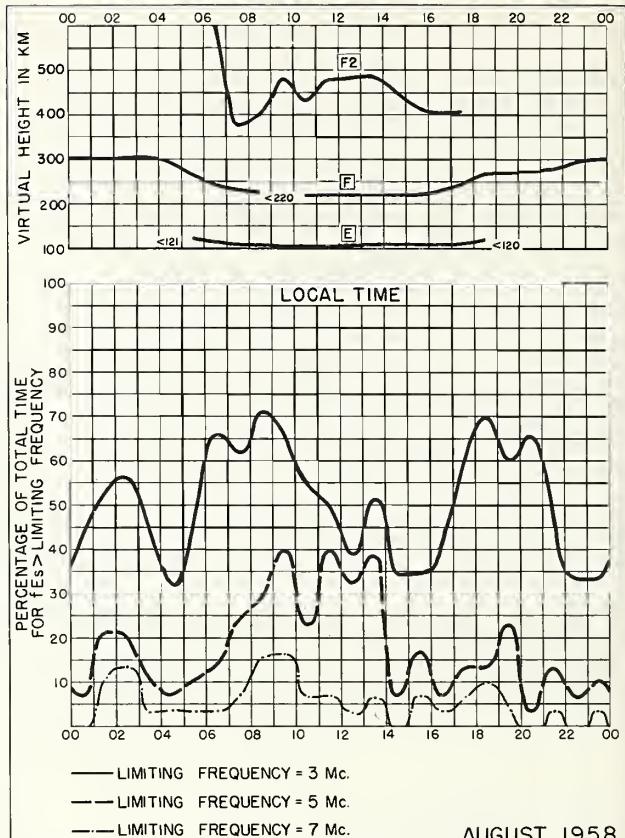


Fig. 22. ST. JOHN'S, NEWFOUNDLAND AUGUST 1958

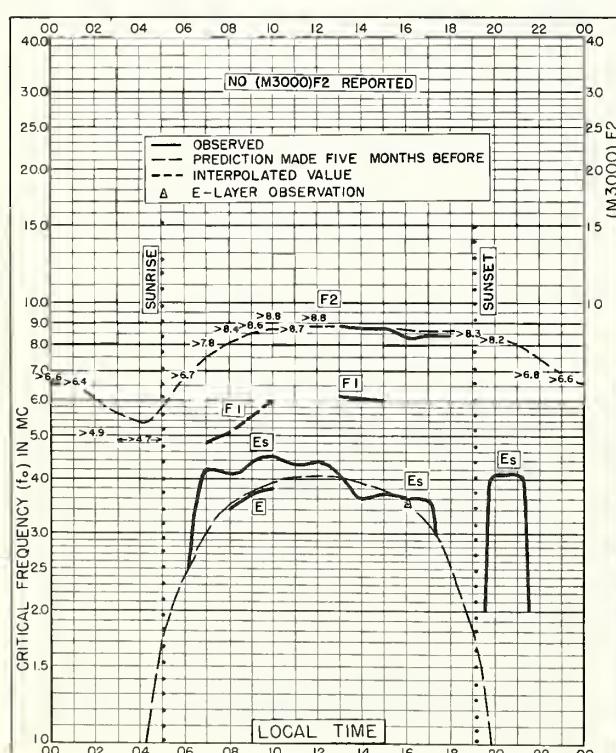


Fig. 23. GRAZ, AUSTRIA
47.1°N, 15.5°E AUGUST 1958

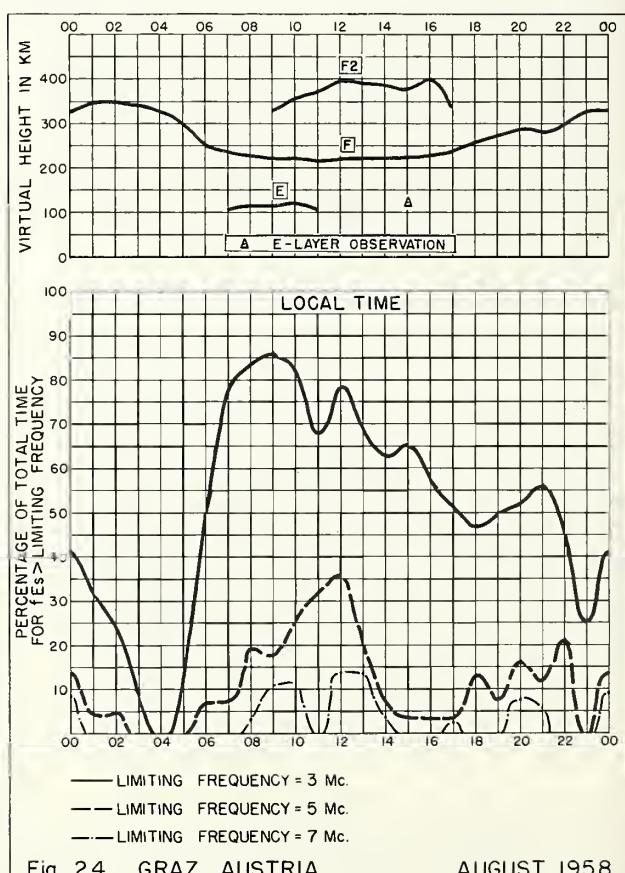


Fig. 24. GRAZ, AUSTRIA AUGUST 1958

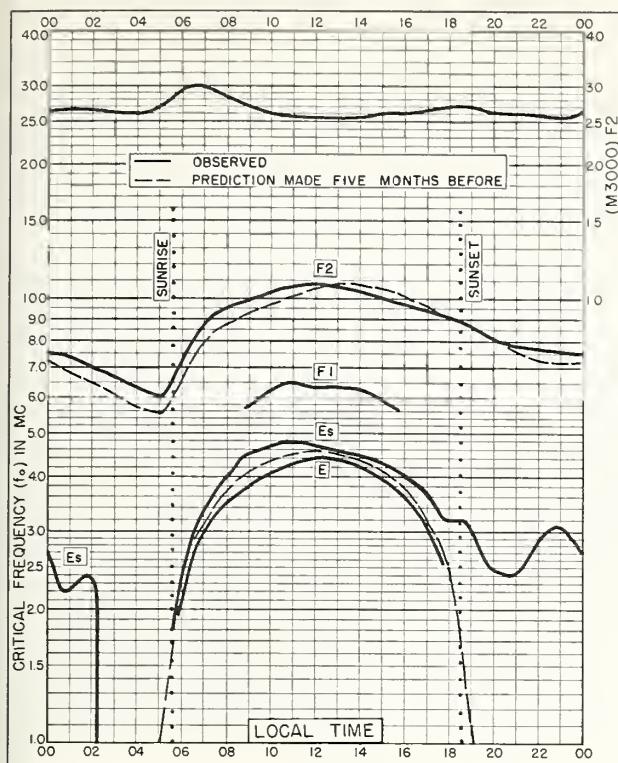


Fig. 25. GRAND BAHAMA I.
26.6°N, 78.2°W AUGUST 1958

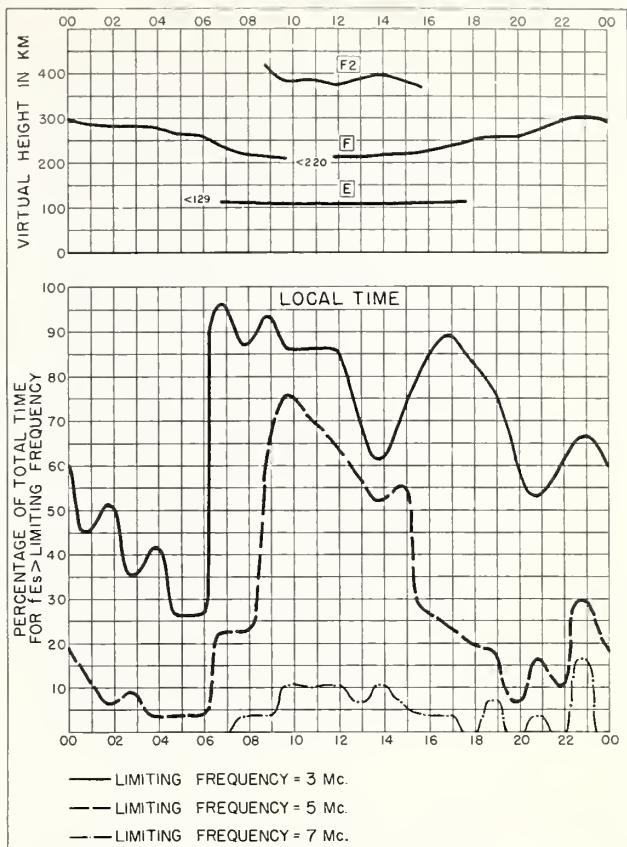


Fig. 26. GRAND BAHAMA I. AUGUST 1958

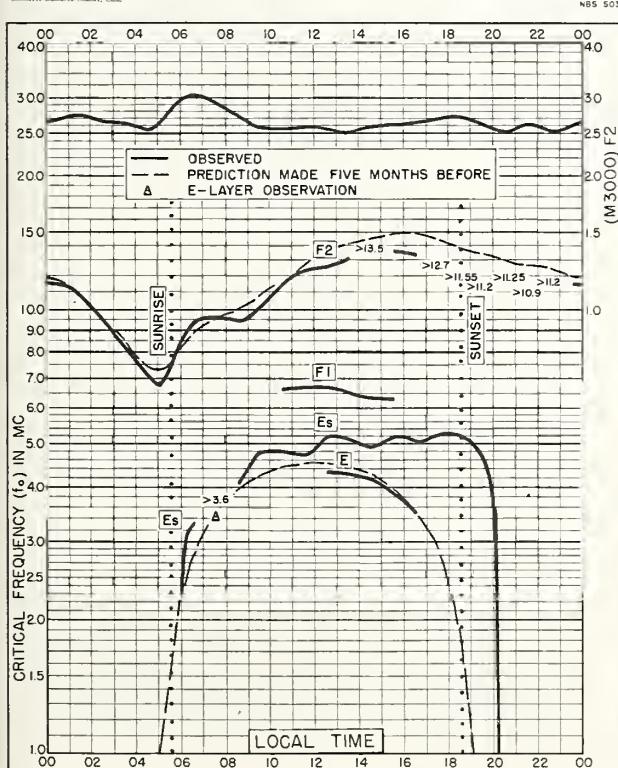


Fig. 27. OKINAWA I.
26.3°N, 127.8°E AUGUST 1958

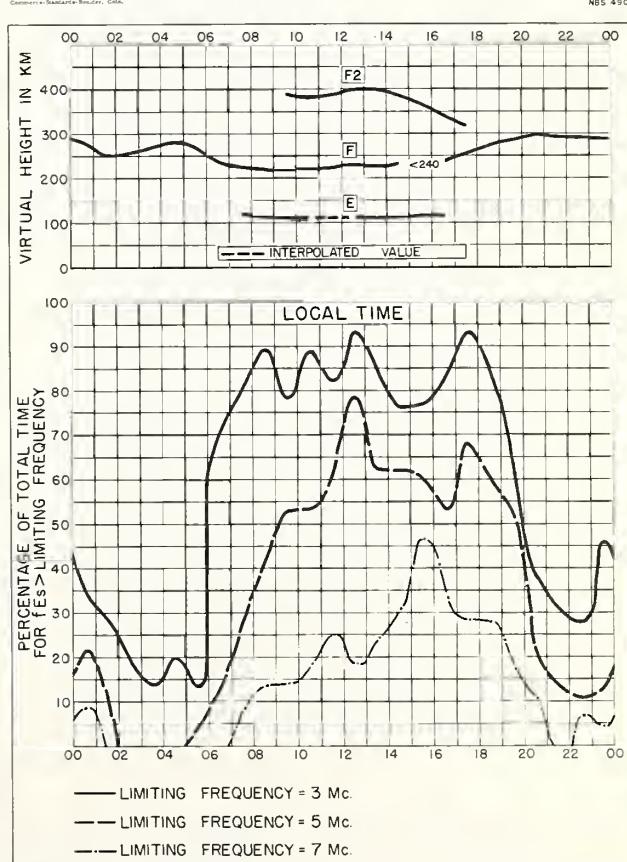


Fig. 28. OKINAWA I. AUGUST 1958

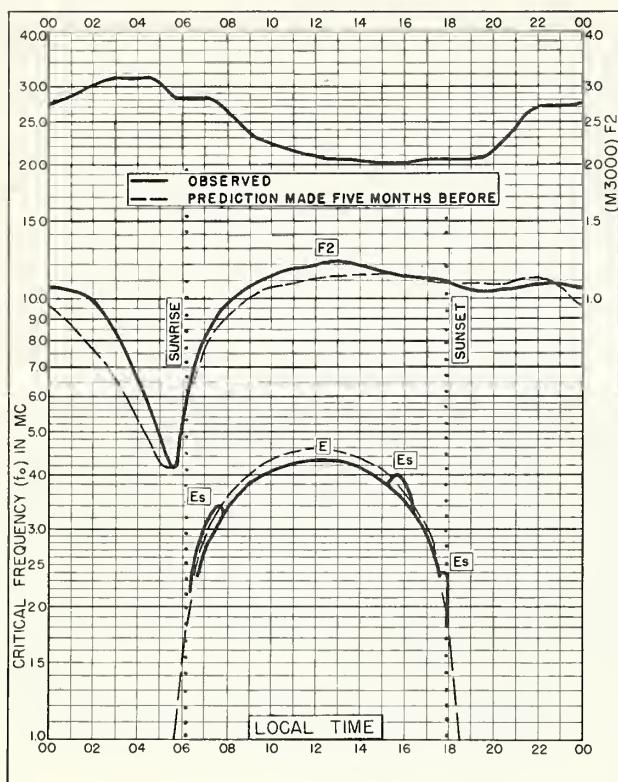


Fig. 29. TALARA, PERU
4.6°S, 81.3°W AUGUST 1958

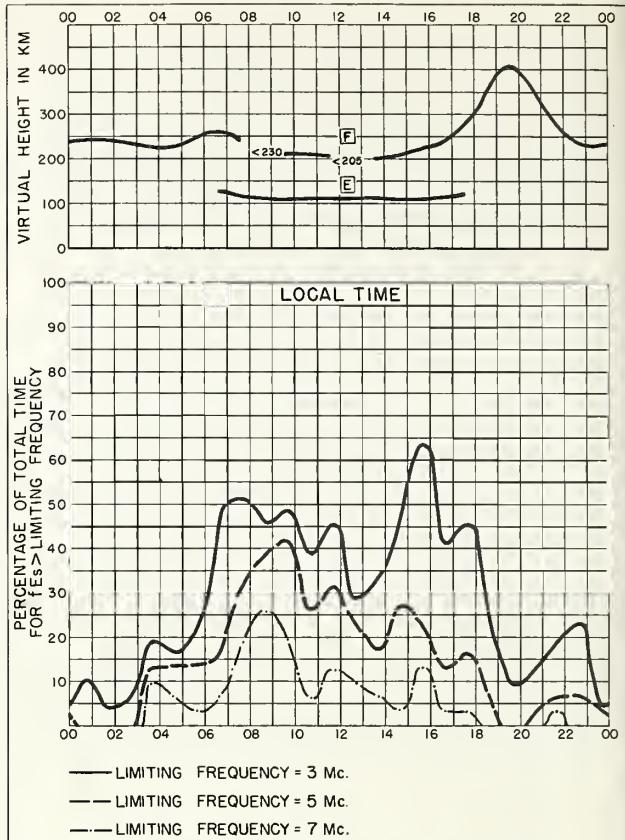


Fig. 30. TALARA, PERU AUGUST 1958

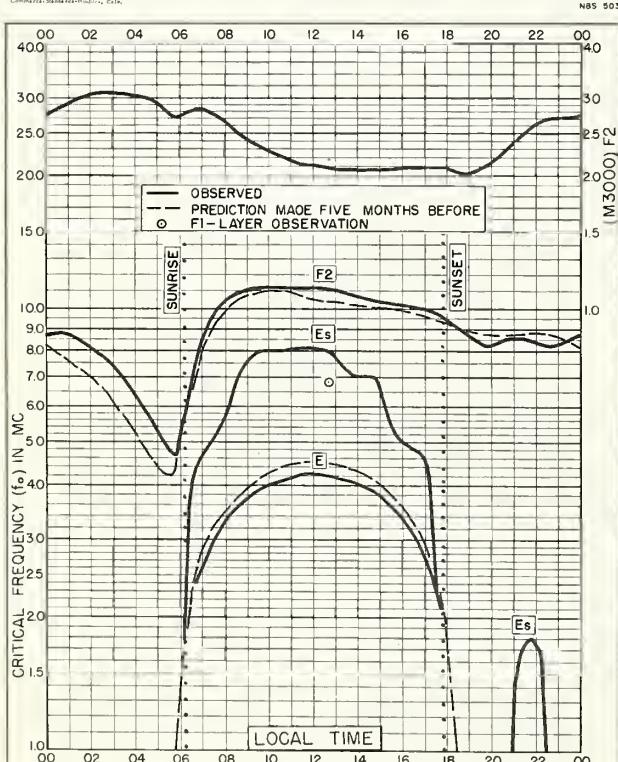


Fig. 31. CHIMBOTE, PERU
9.1°S, 78.6°W AUGUST 1958

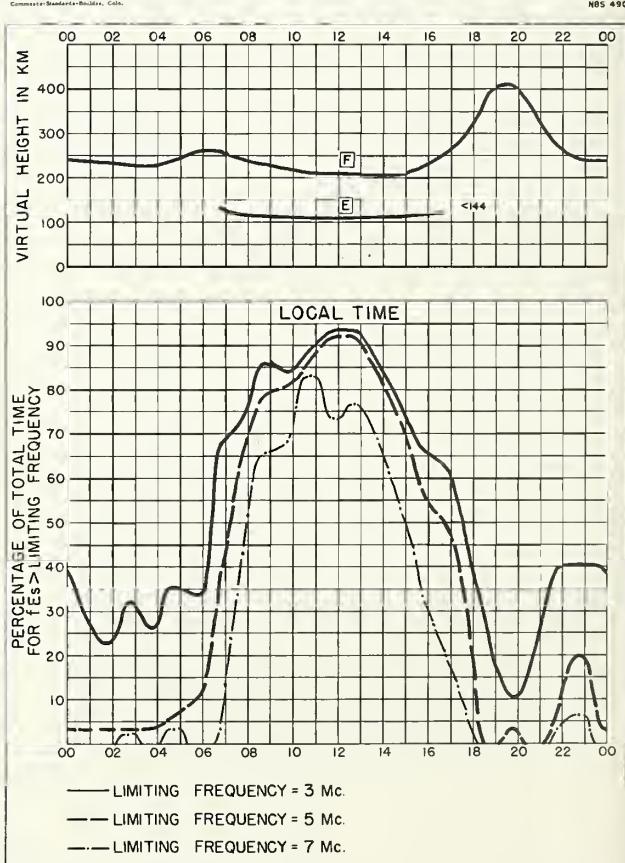
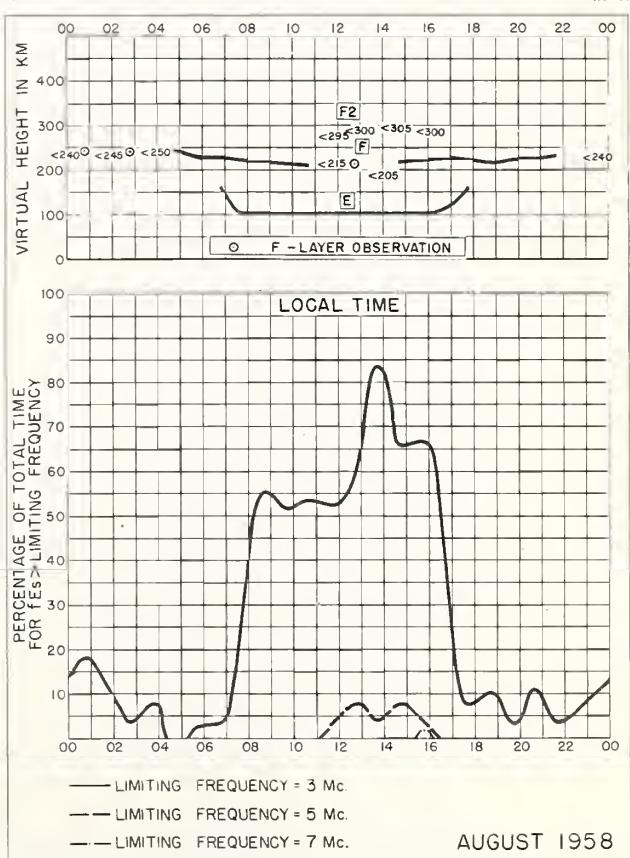
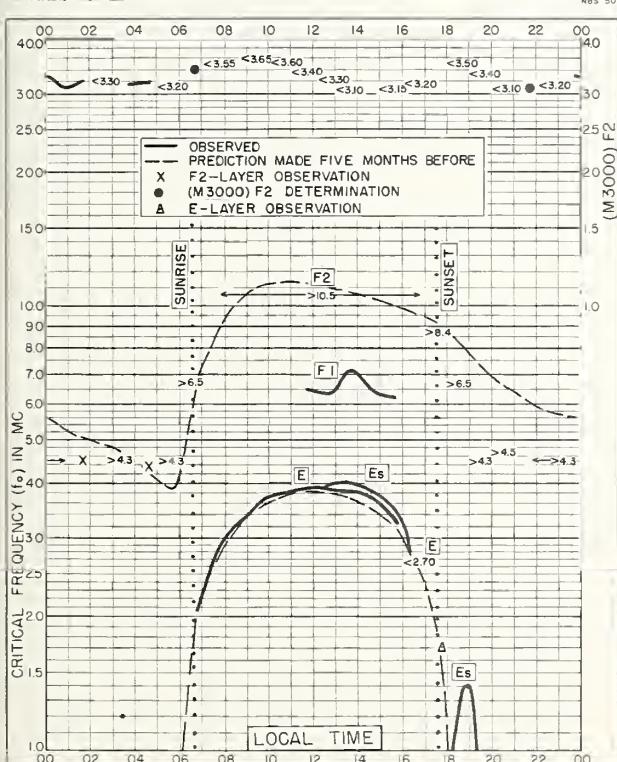
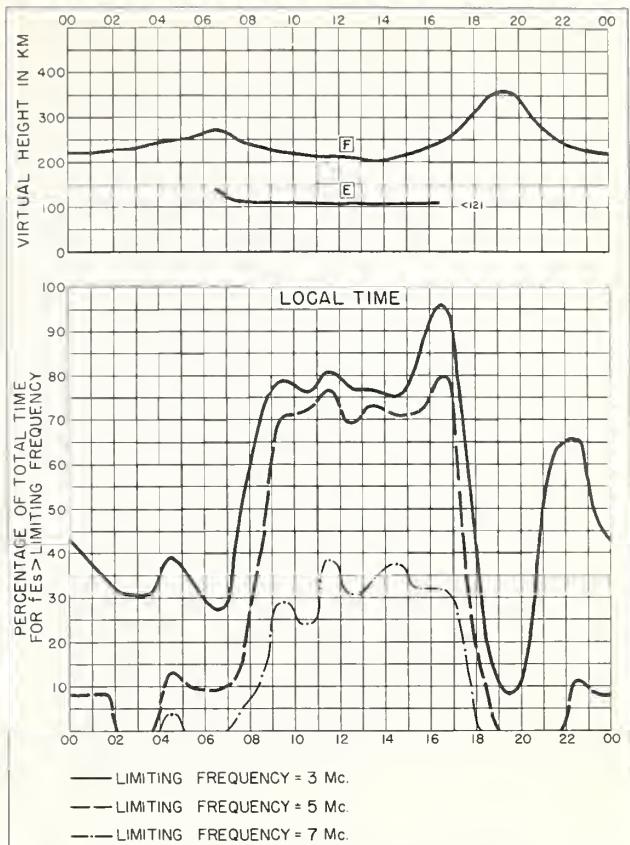
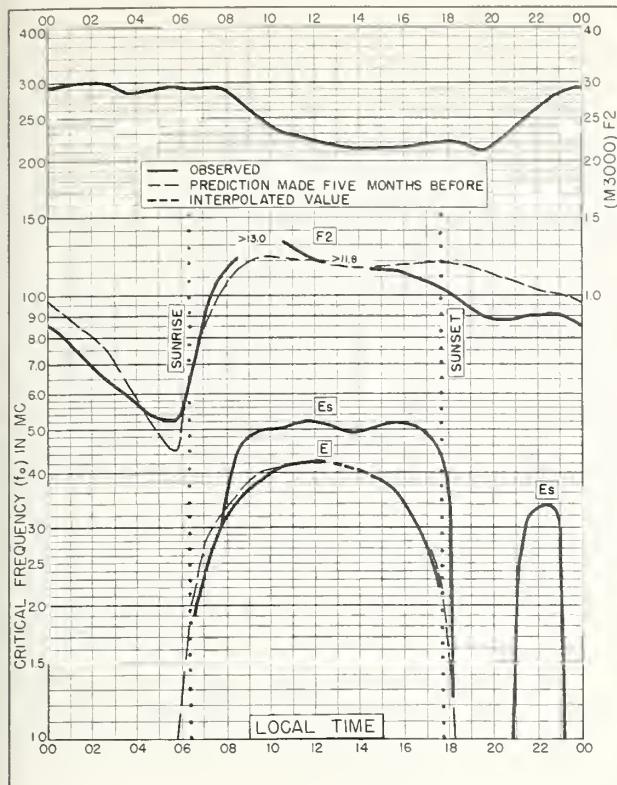


Fig. 32. CHIMBOTE, PERU AUGUST 1958



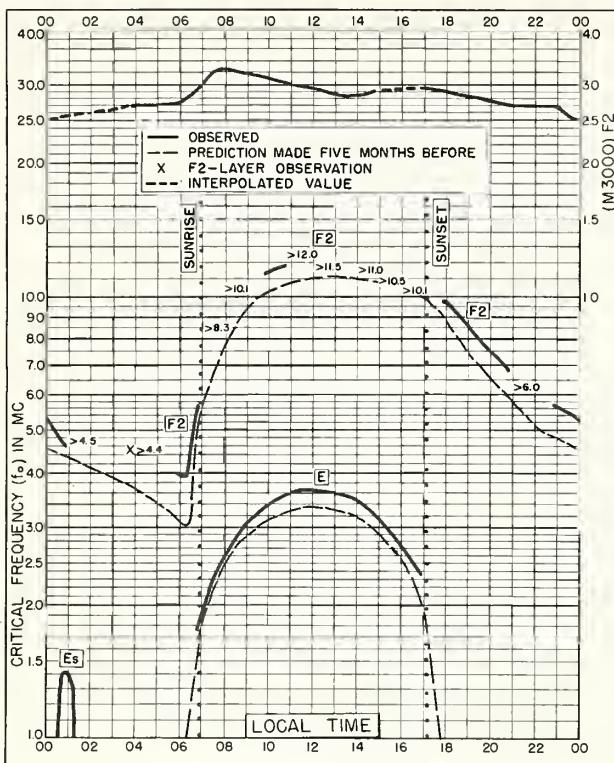


Fig. 37. HOBART, TASMANIA

42.9°S, 147.2°E

AUGUST 1958

Commerce-Standard-Boulder, Colo. NBS 503

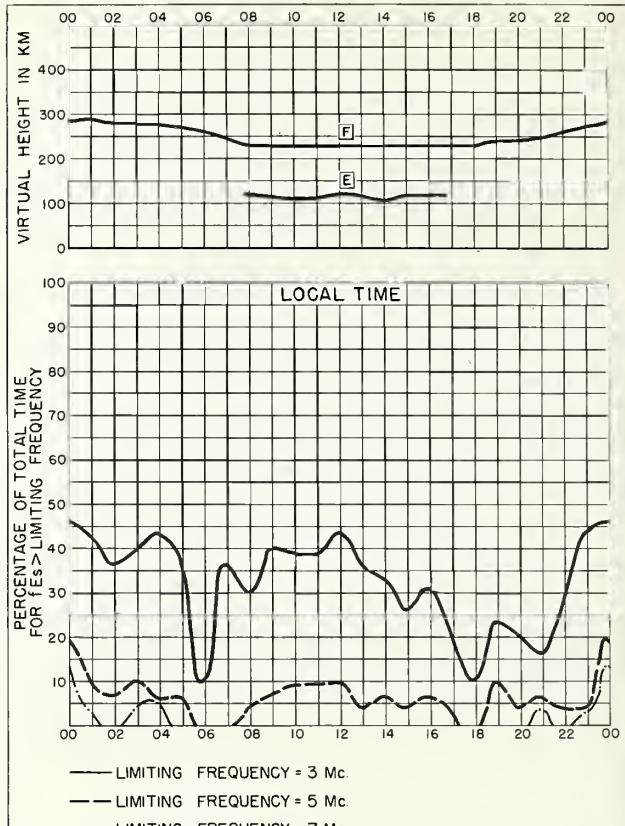


Fig. 38. HOBART, TASMANIA

AUGUST 1958

Commerce-Standard-Boulder, Colo. NBS 490

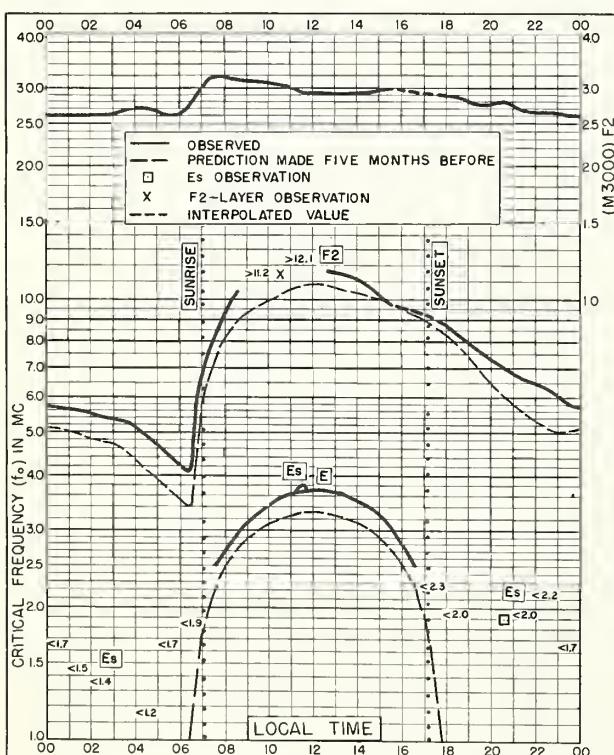


Fig. 39. CHRISTCHURCH, NEW ZEALAND

43.6°S, 172.8°E

AUGUST 1958

Commerce-Standard-Boulder, Colo. NBS 503

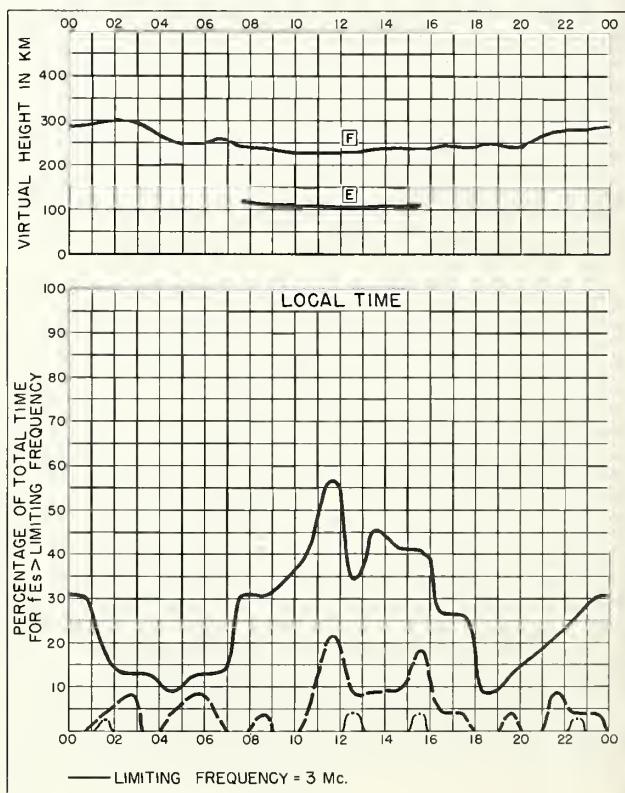
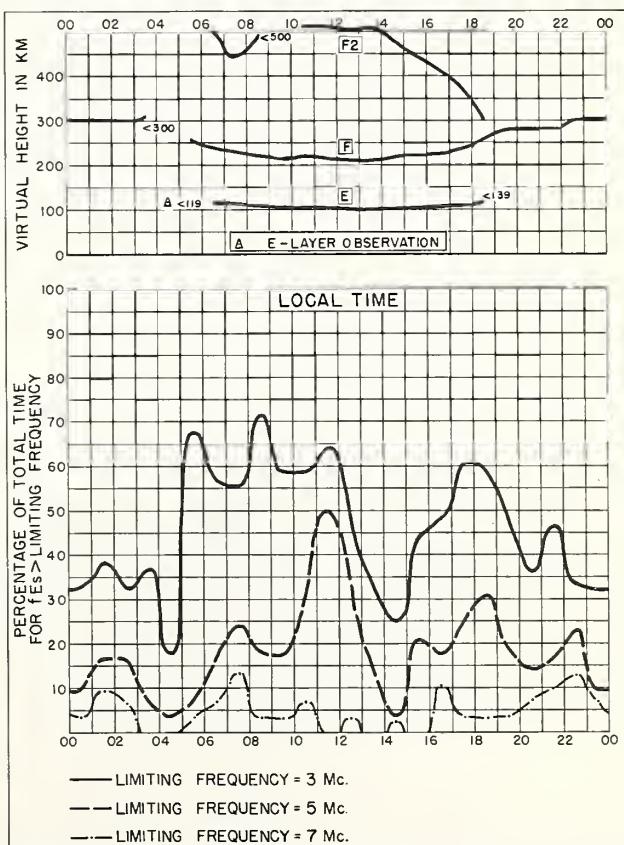
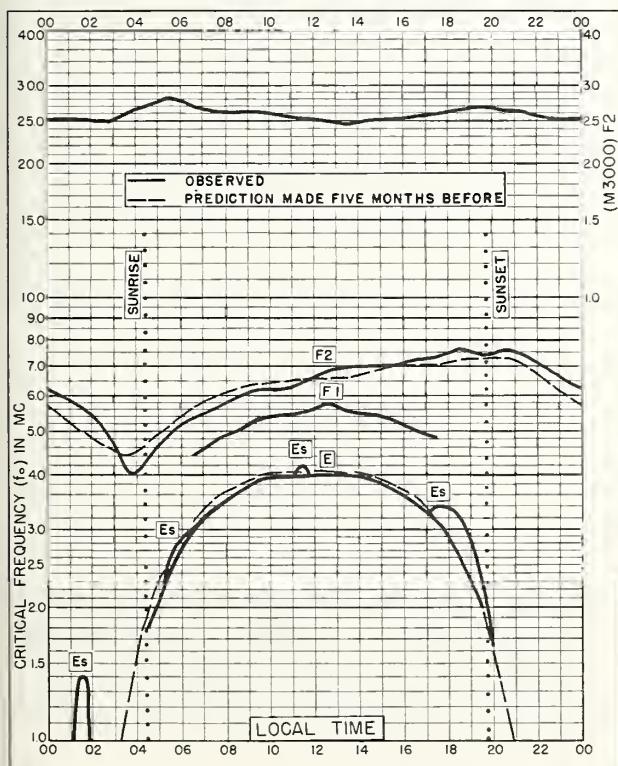
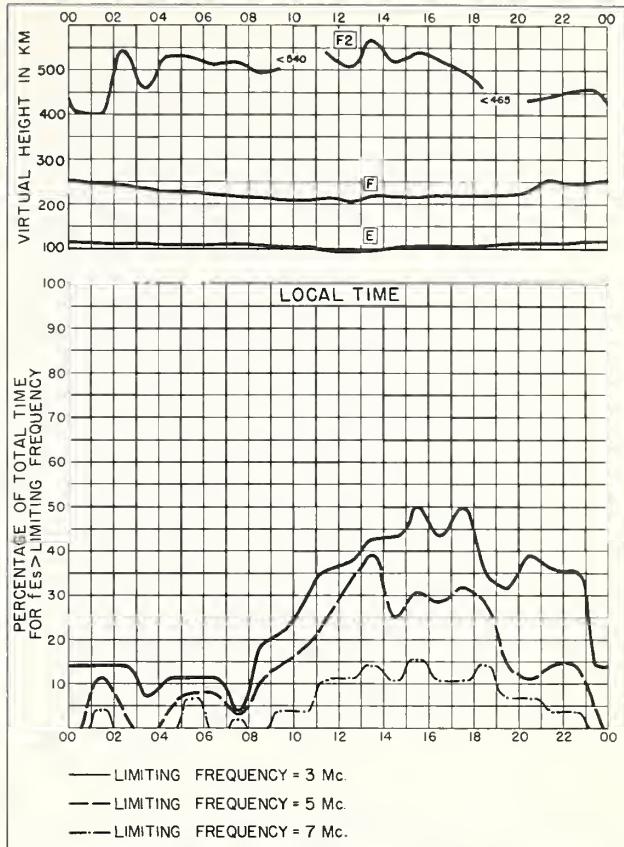
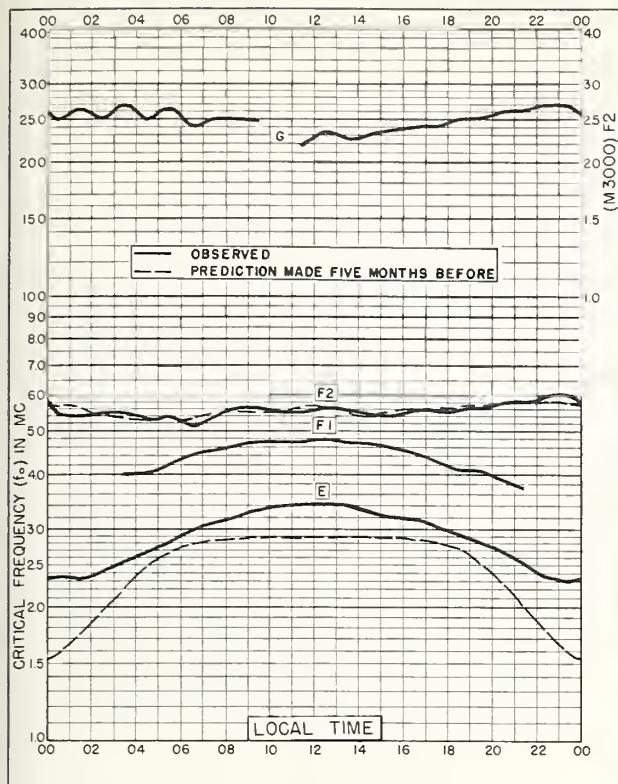
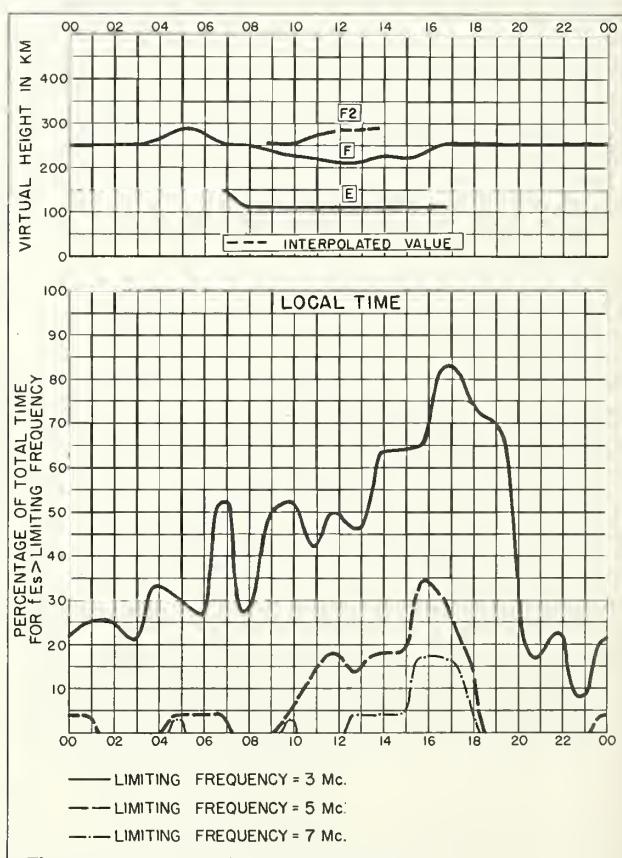
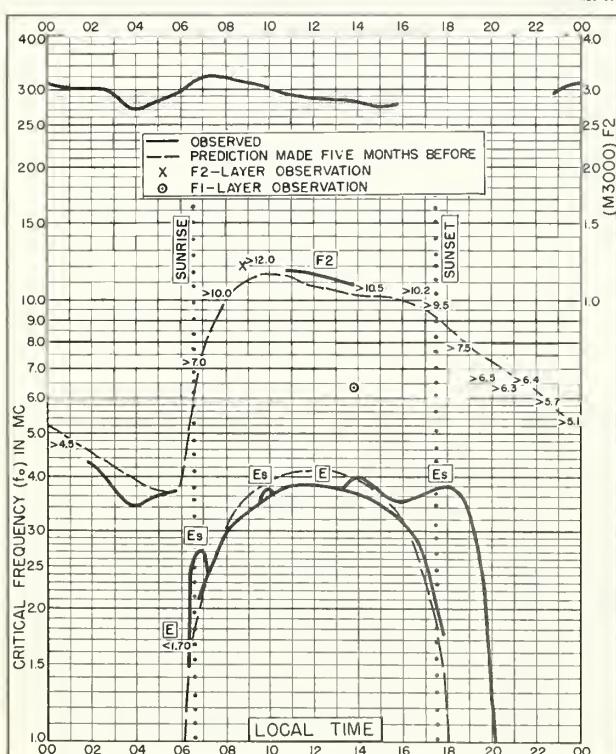
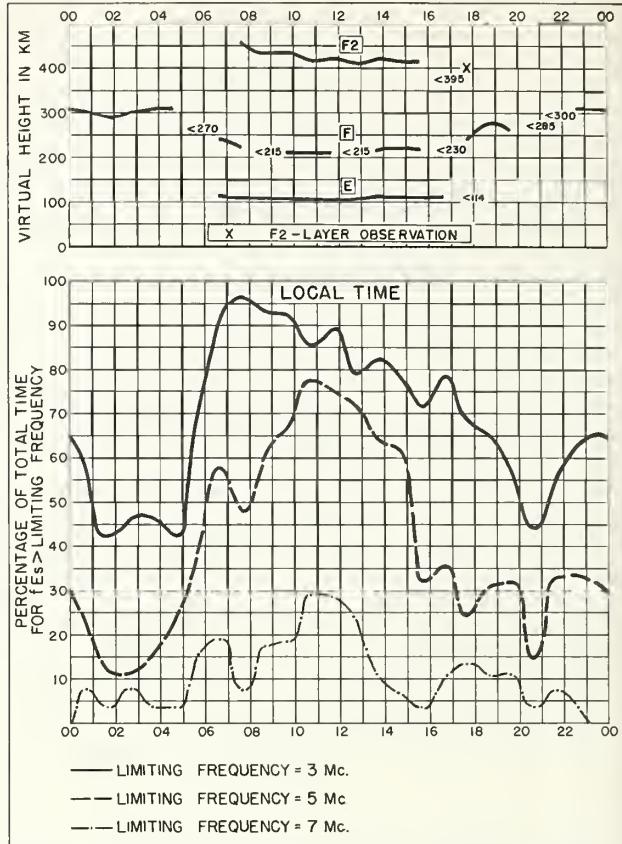
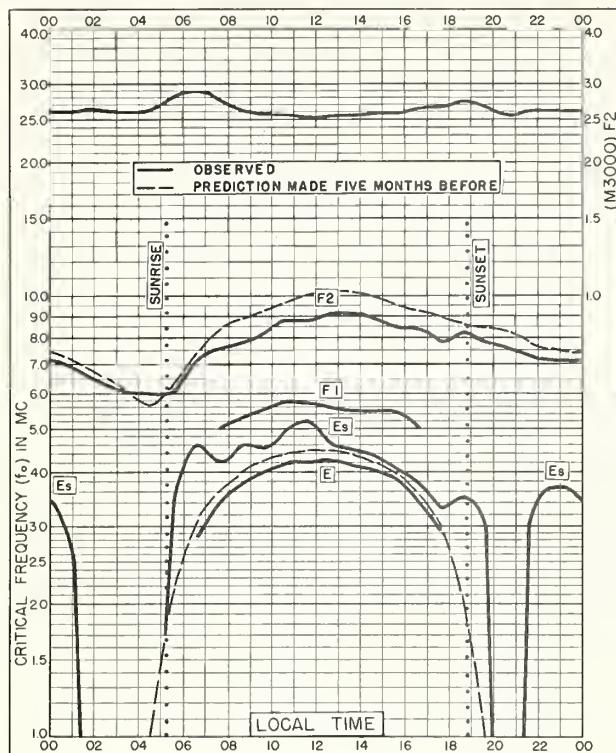


Fig. 40. CHRISTCHURCH, NEW ZEALAND

AUGUST 1958

Commerce-Standard-Boulder, Colo. NBS 490





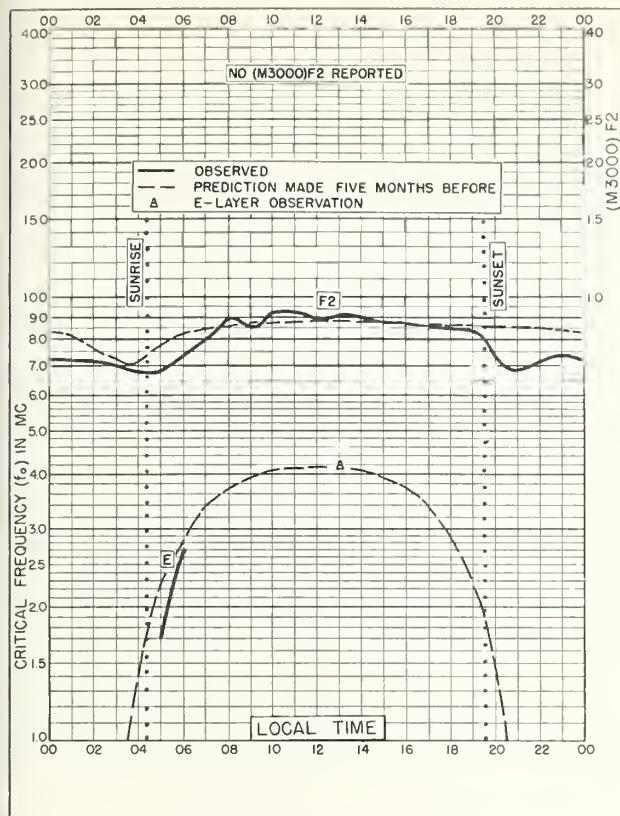


Fig. 49. MONTE CAPELLINO, ITALY
44.6°N, 9.0°E JUNE 1958

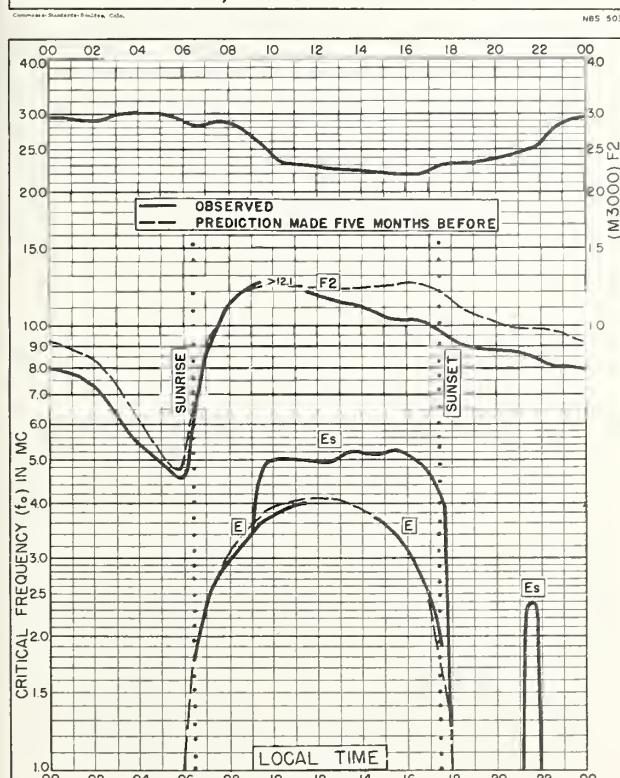


Fig. 50. LA PAZ, BOLIVIA
16.5°S, 68.0°W JUNE 1958

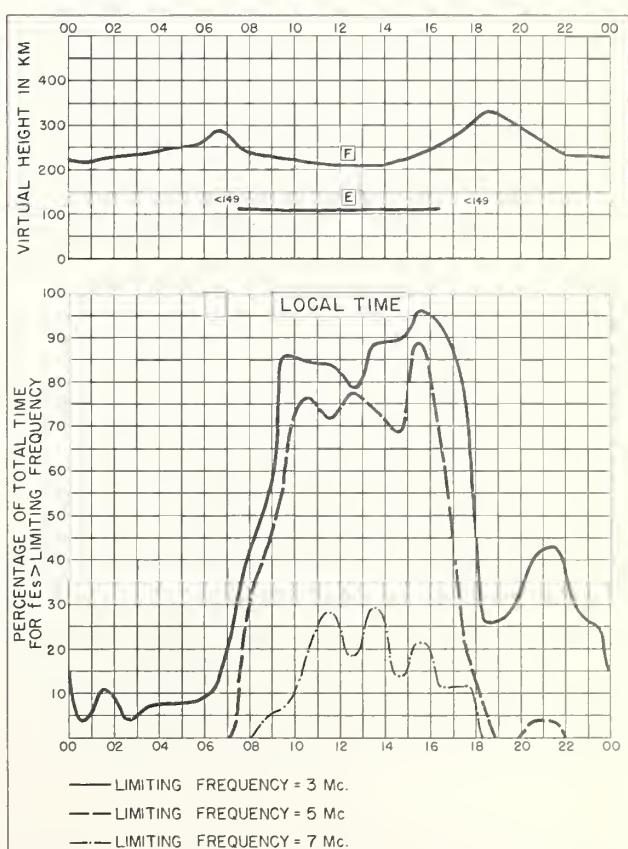


Fig. 51. LA PAZ, BOLIVIA JUNE 1958

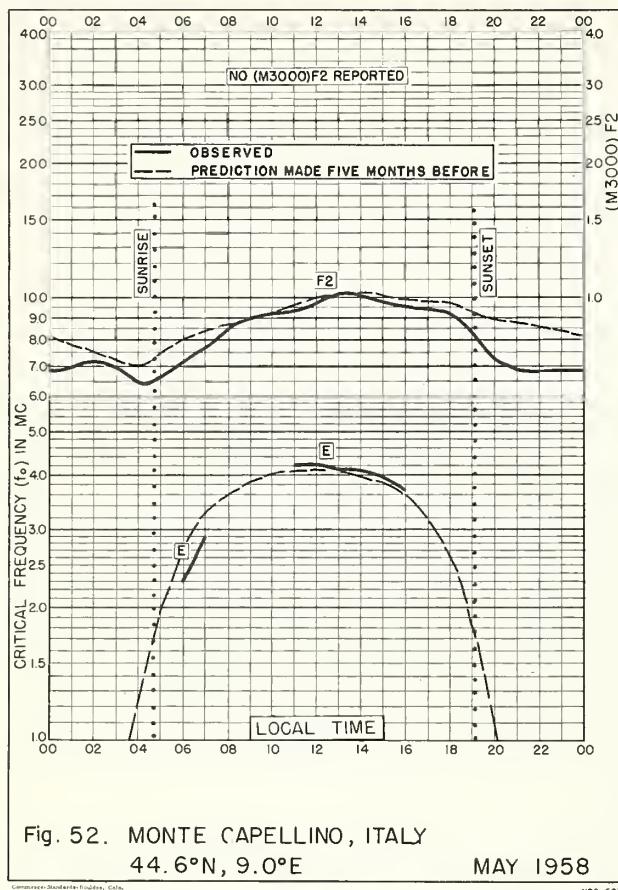


Fig. 52. MONTE CAPELLINO, ITALY

44.6°N, 9.0°E

MAY 1958

Compton-Standard-Friddle, Calif.

NBS 503

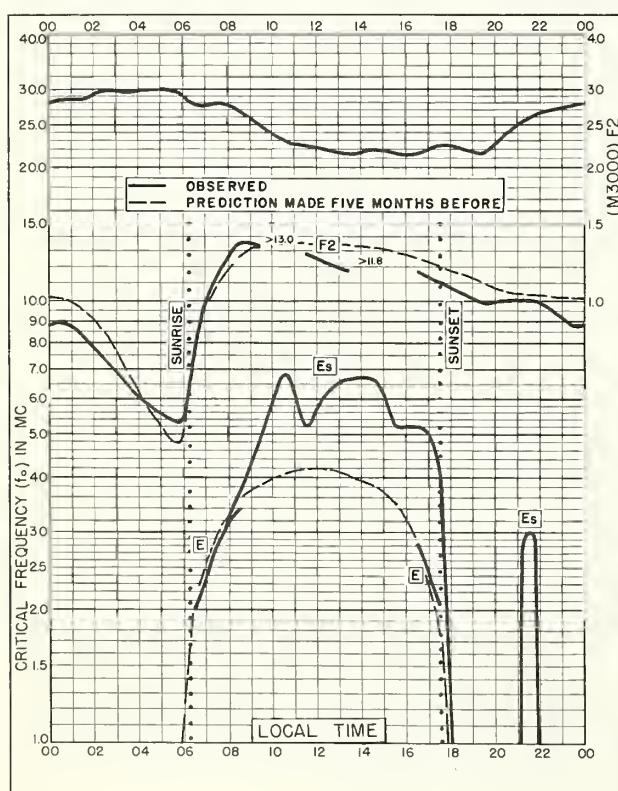


Fig. 53. LA PAZ, BOLIVIA

16.5°S, 68.0°W

MAY 1958

Compton-Standard-Friddle, Calif.

NBS 503

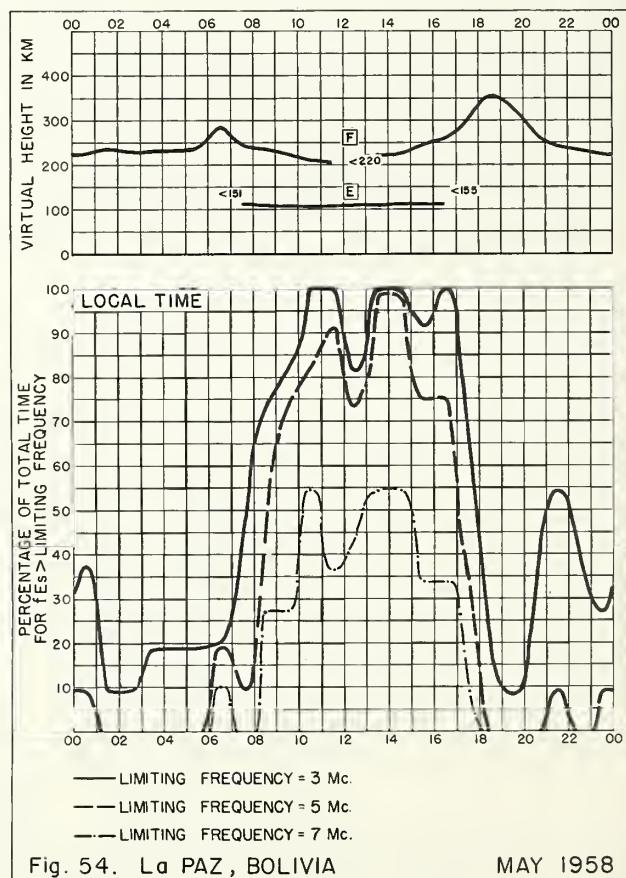
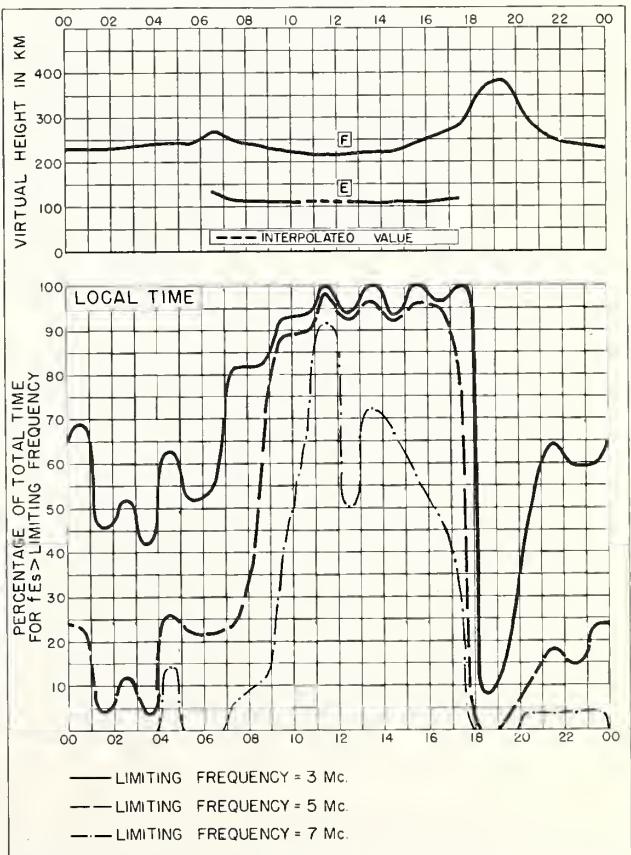
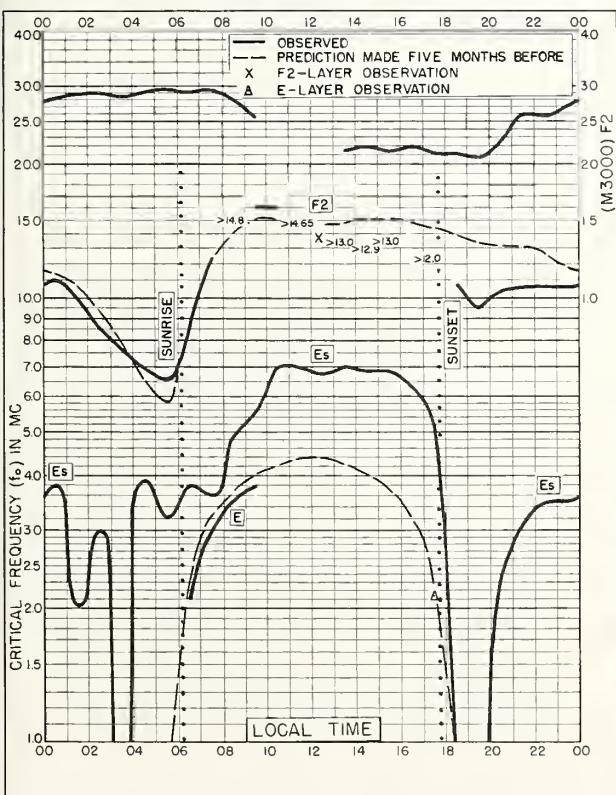
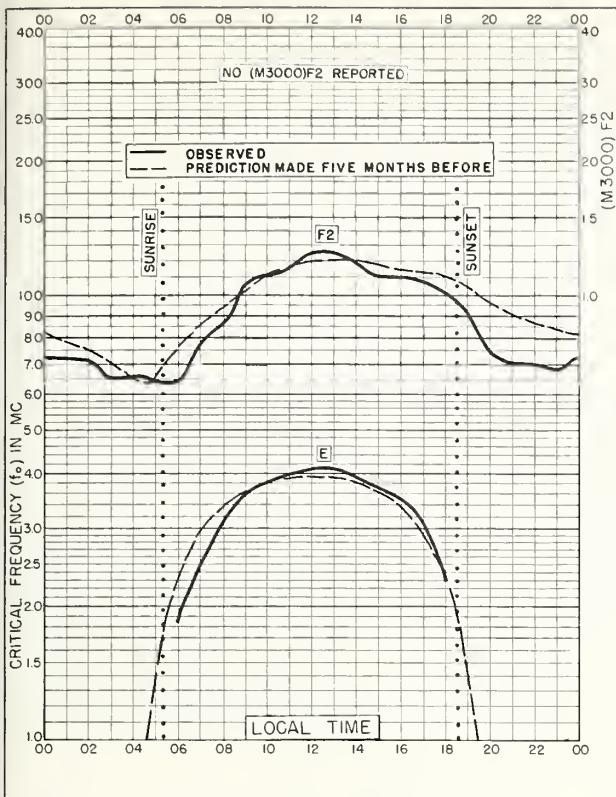
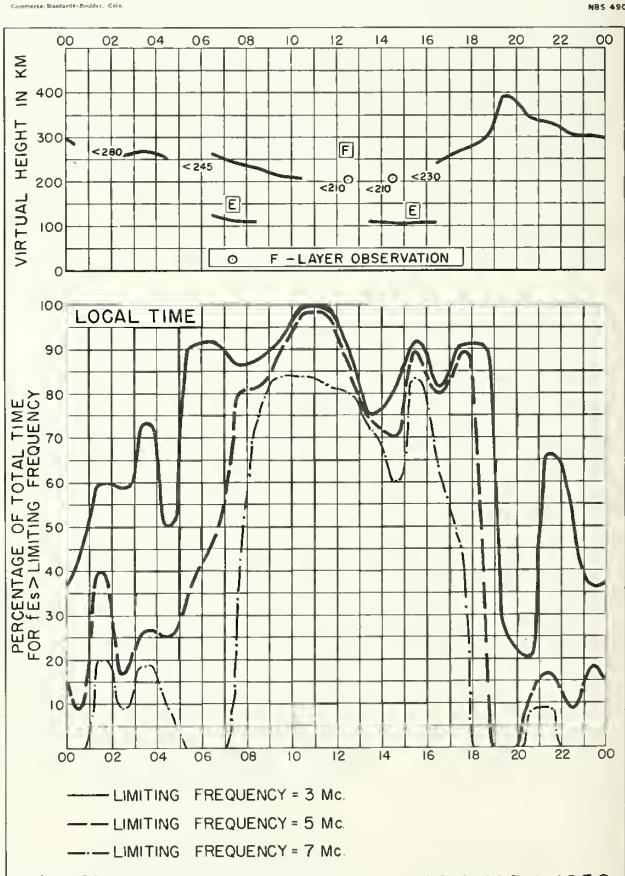
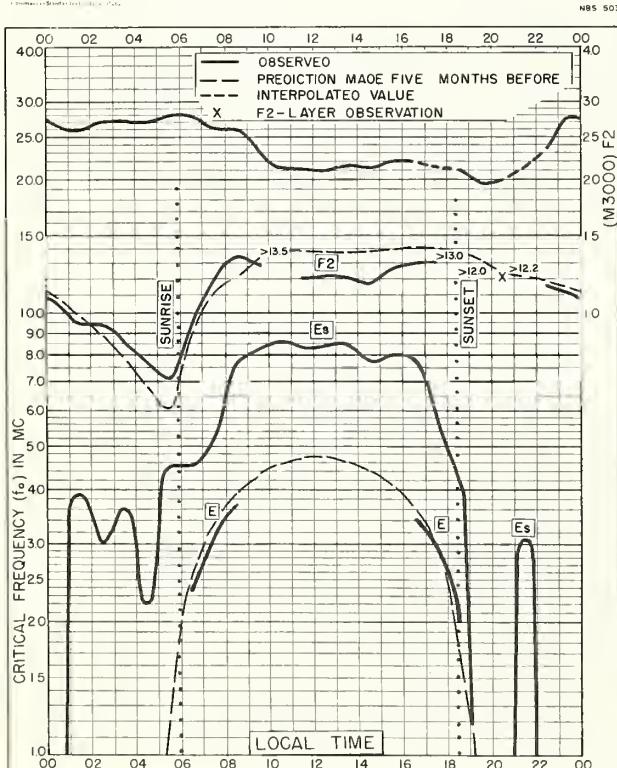
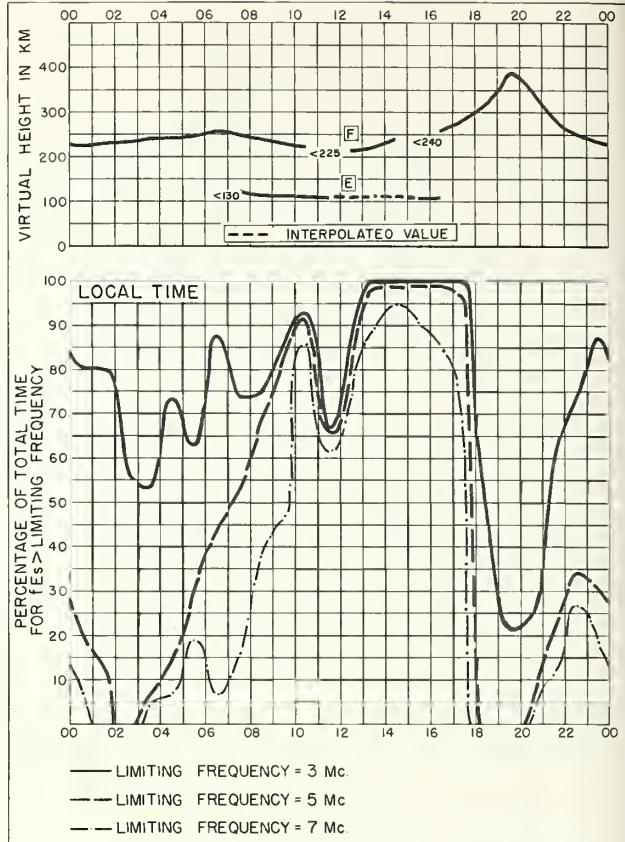
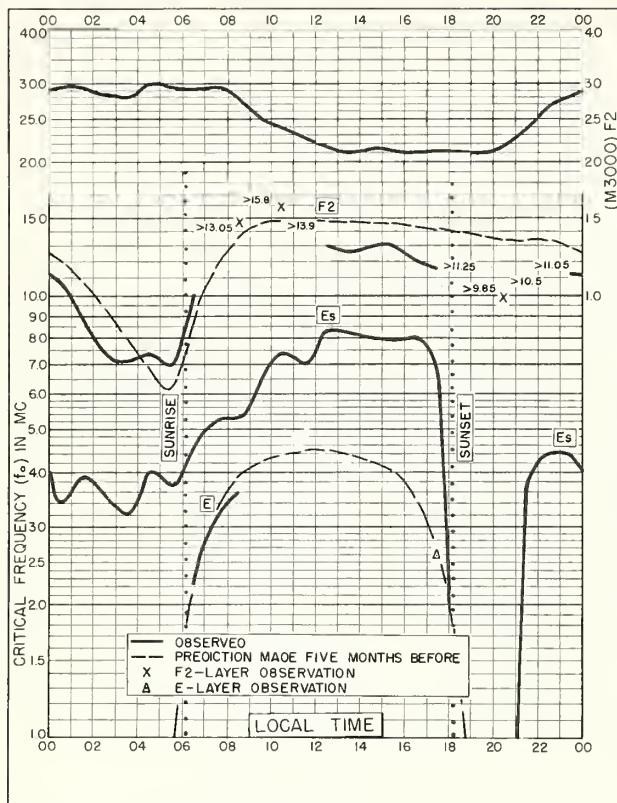


Fig. 54. LA PAZ, BOLIVIA

MAY 1958

NBS 490





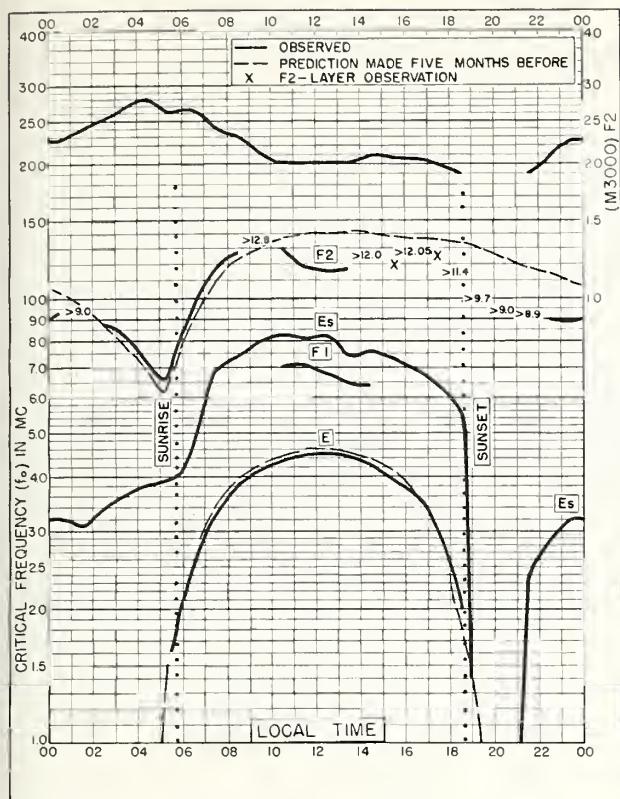


Fig. 62. La PAZ, BOLIVIA
16.5°S, 68.0°W JANUARY 1958

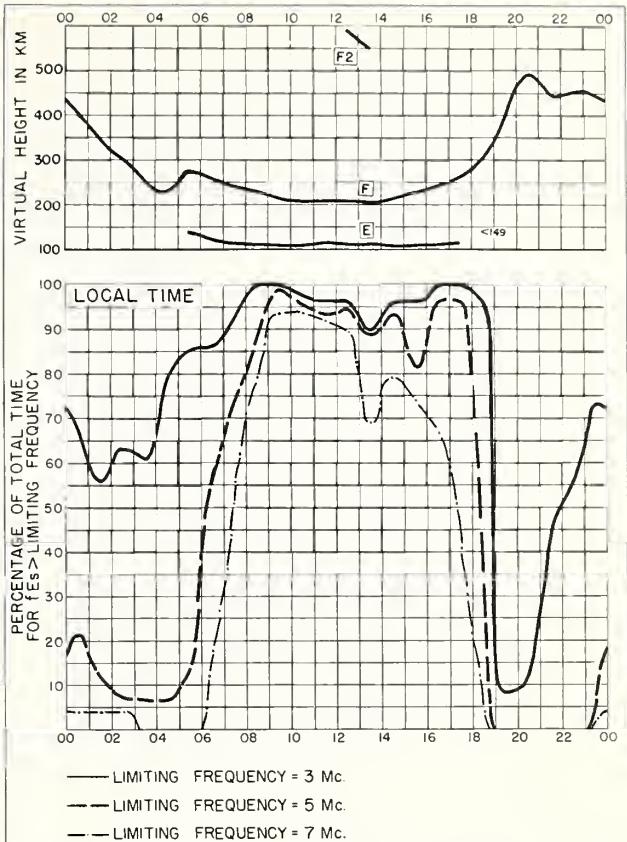


Fig. 63. La PAZ, BOLIVIA JANUARY 1958

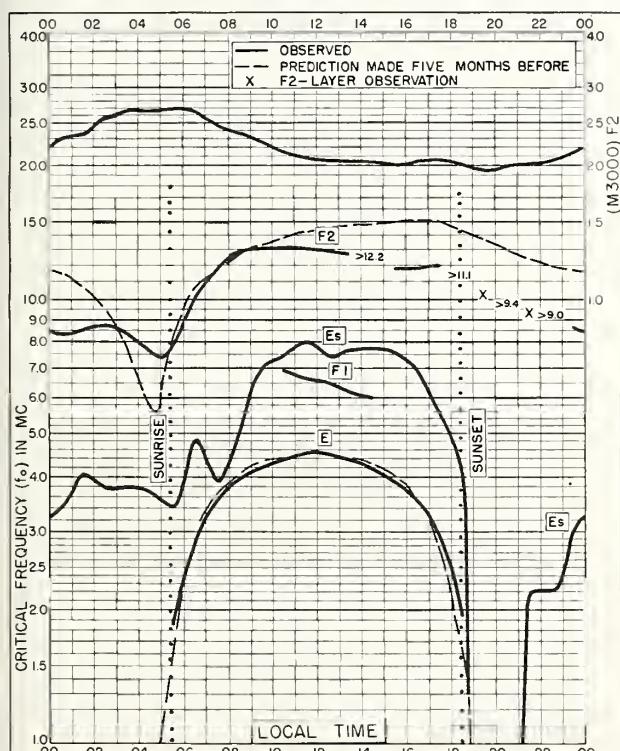


Fig. 64. La PAZ, BOLIVIA
16.5°S, 68.0°W DECEMBER 1957

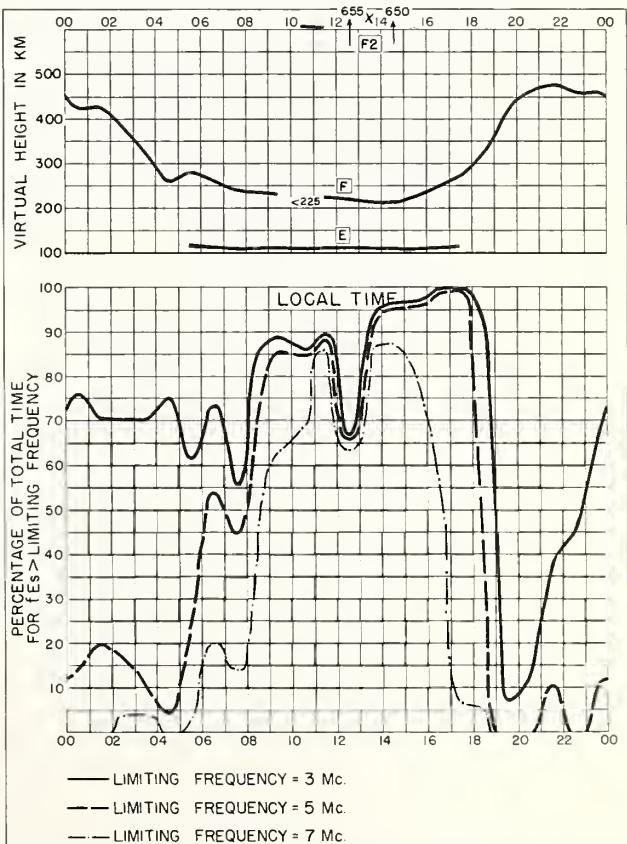


Fig. 65. La PAZ, BOLIVIA DECEMBER 1957

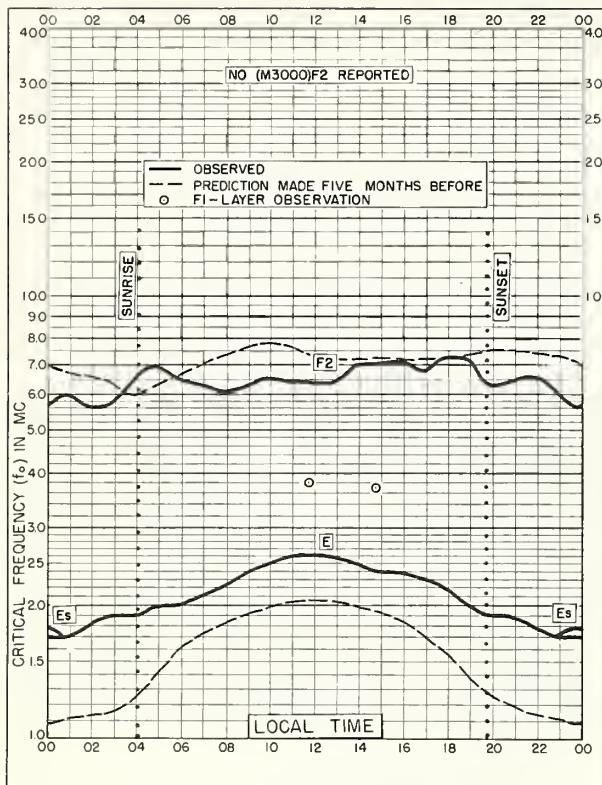


Fig. 66. ALERT, CANADA
82.5°N, 62.6°W SEPTEMBER 1957

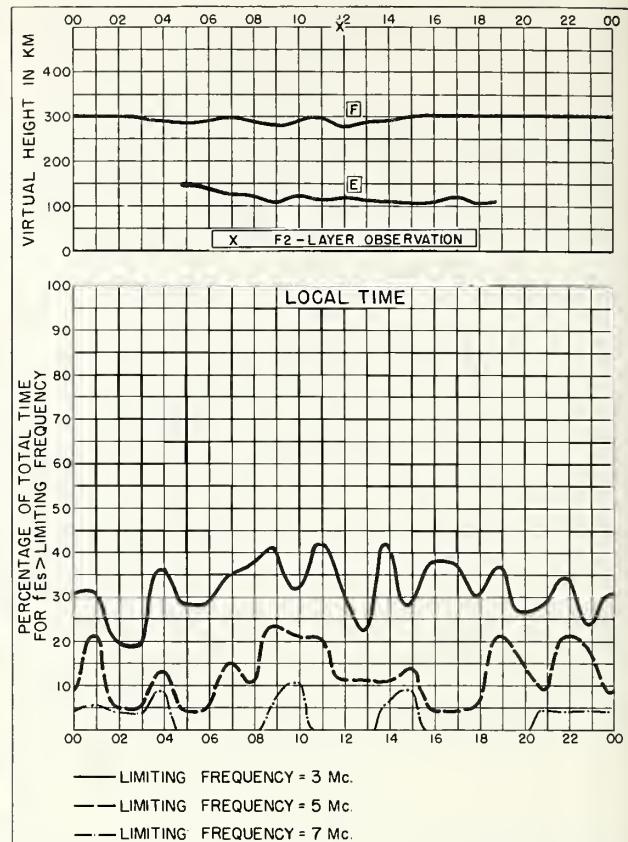


Fig. 67. ALERT, CANADA SEPTEMBER 1957

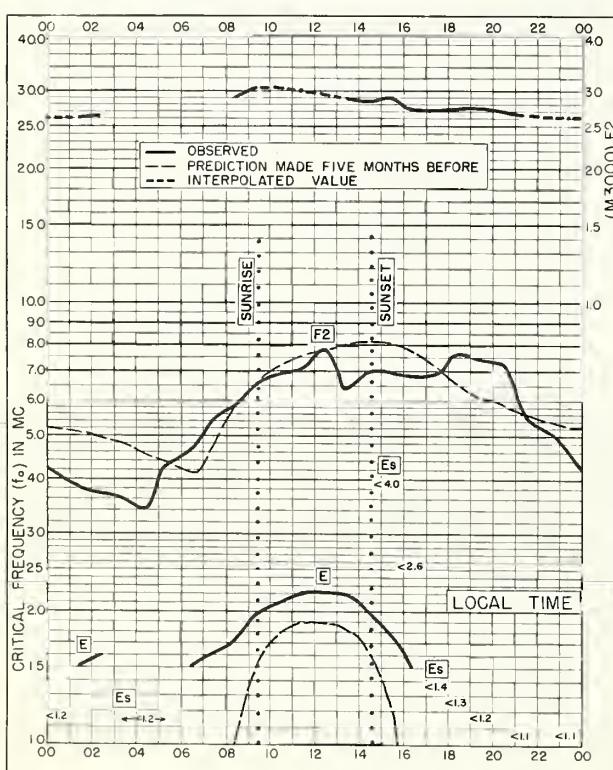


Fig. 68. CAPE HALLETT
72.3°S, 170.3°E AUGUST 1957

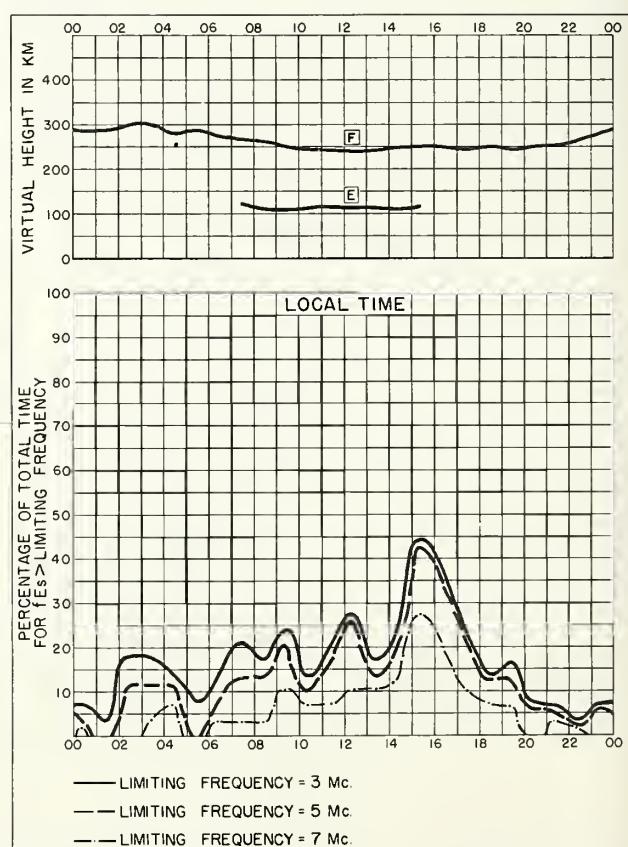
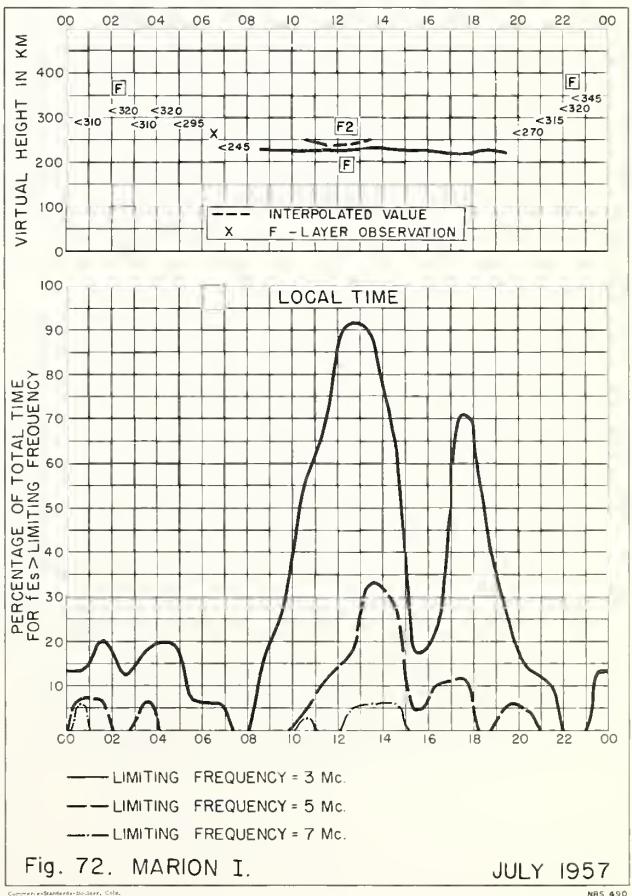
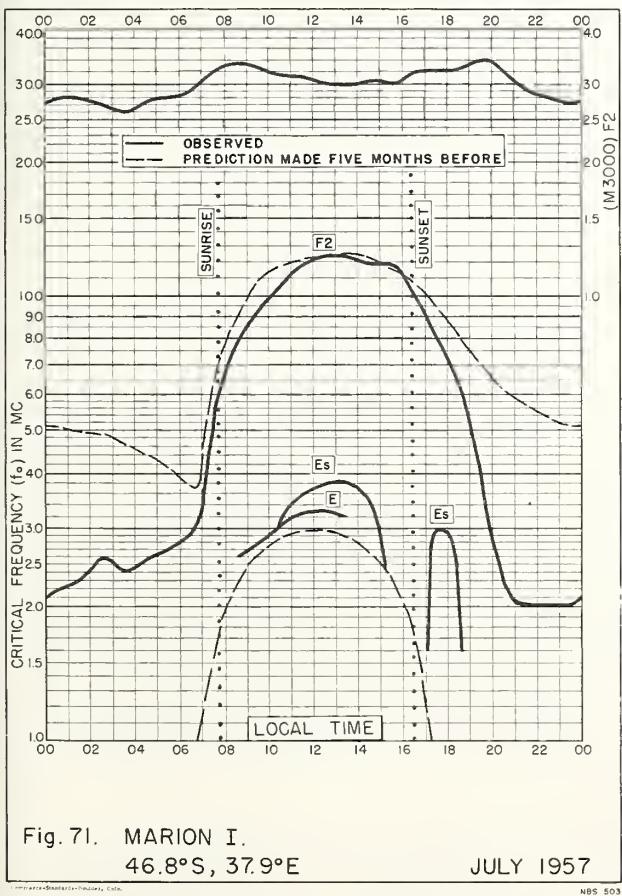
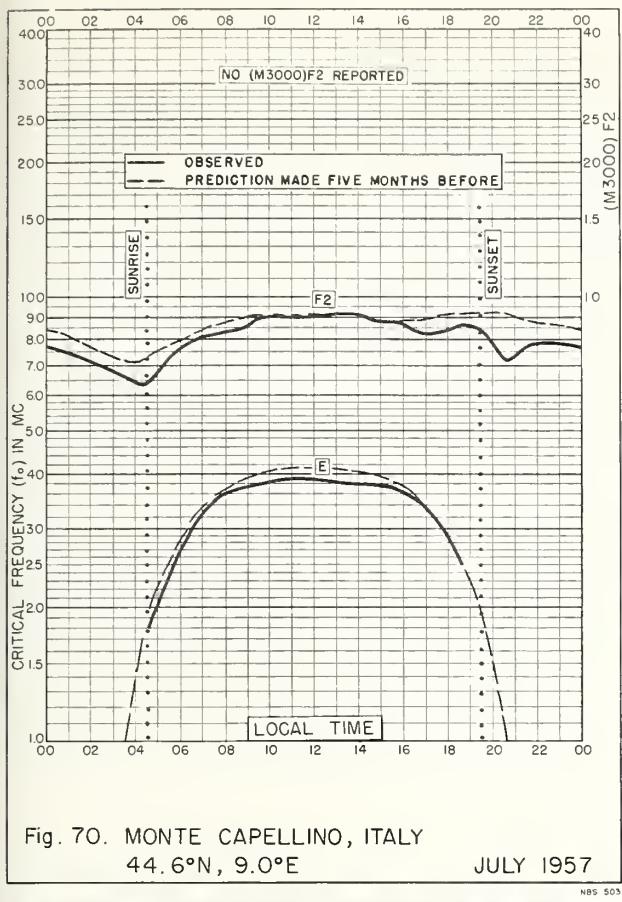


Fig. 69. CAPE HALLETT AUGUST 1957



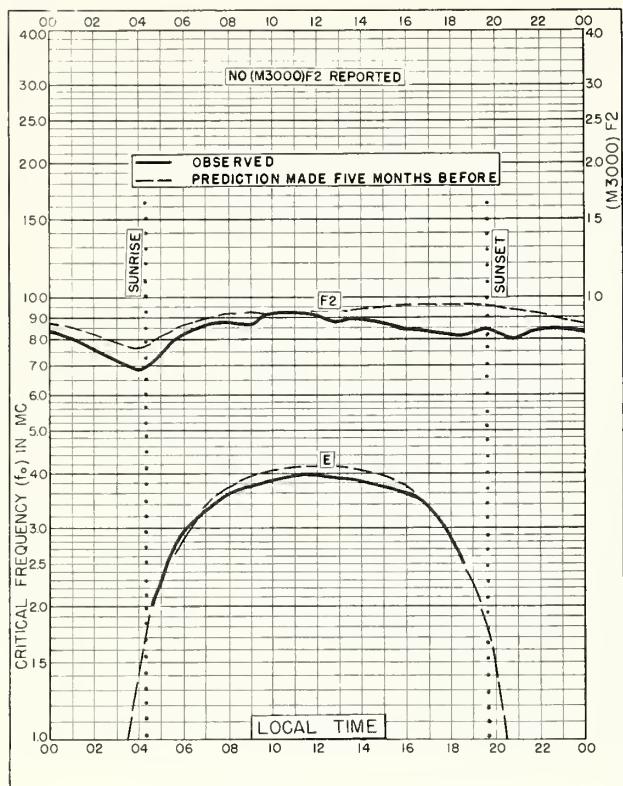


Fig. 73. MONTE CAPELLINO, ITALY
44.6°N, 9.0°E JUNE 1957

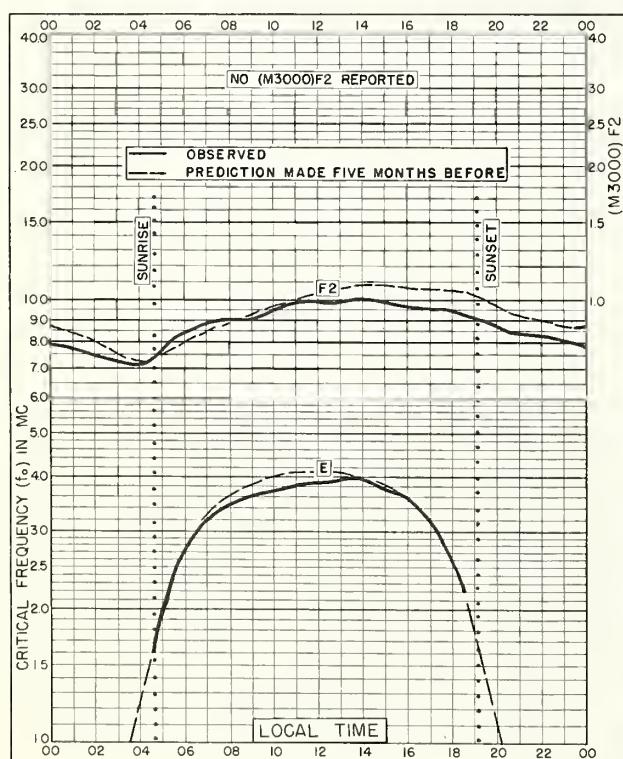


Fig. 74. MONTE CAPELLINO, ITALY
44.6°N, 9.0°E MAY 1957

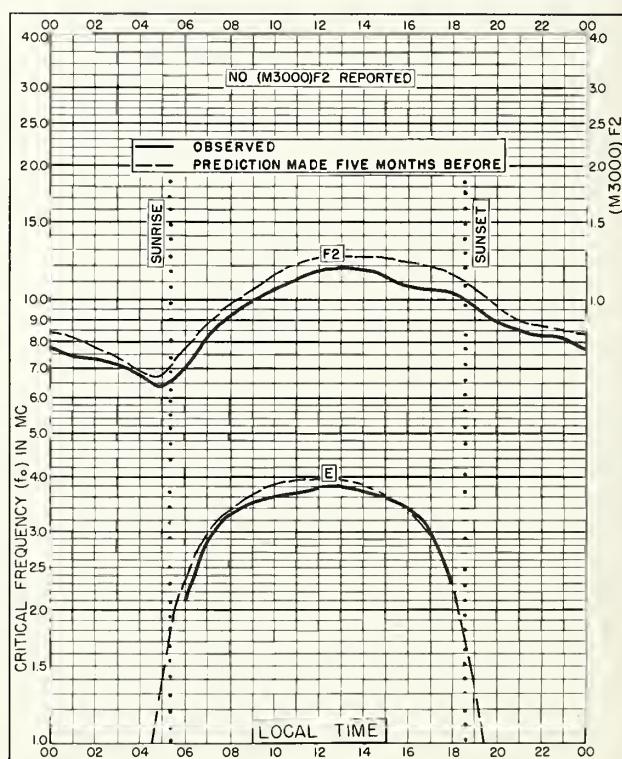
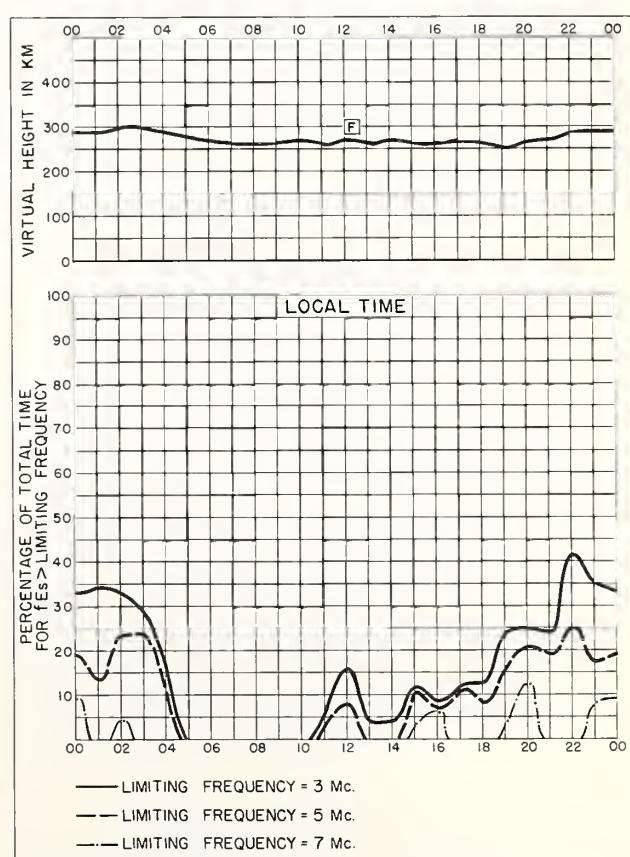
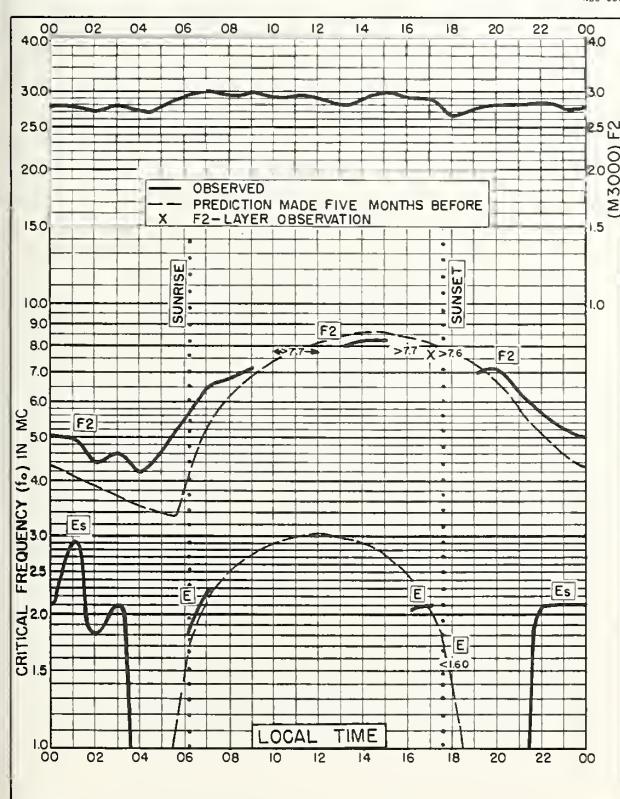
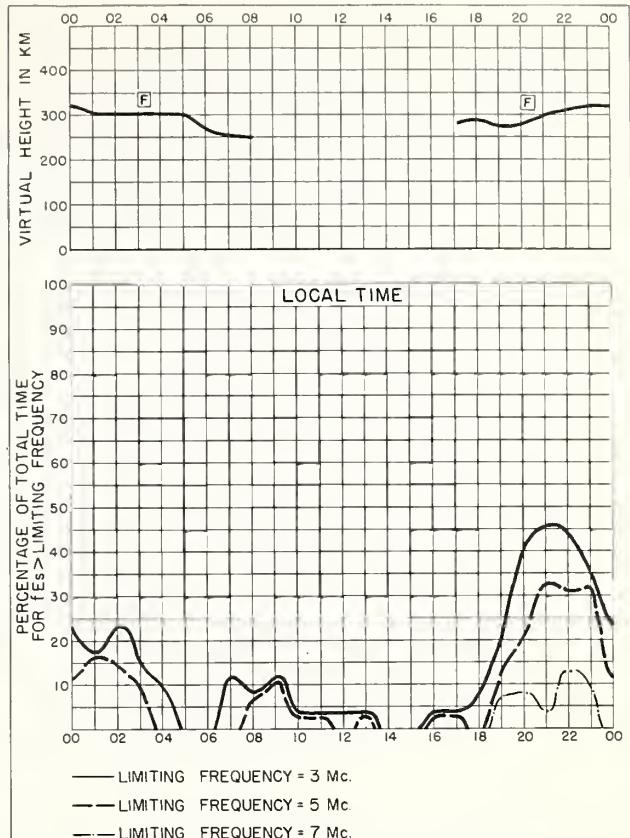
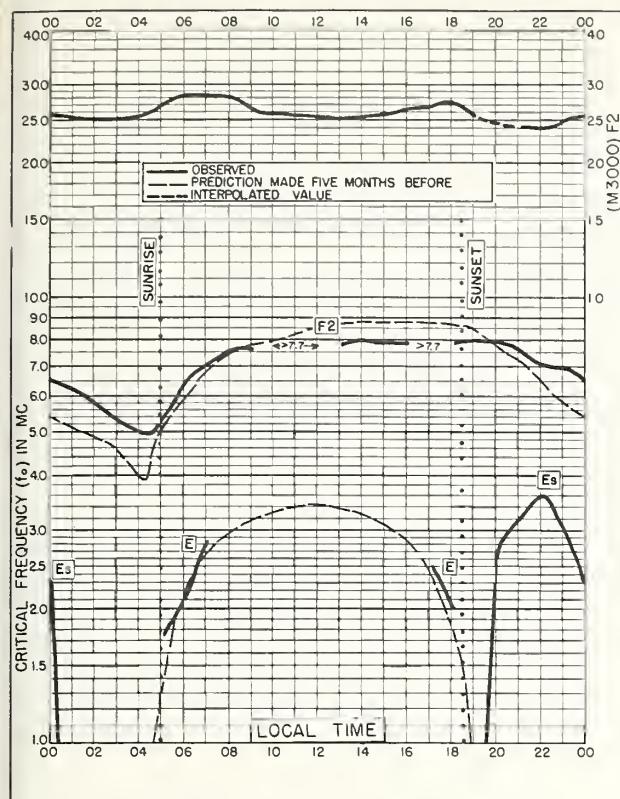


Fig. 75. MONTE CAPELLINO, ITALY
44.6°N, 9.0°E APRIL 1957



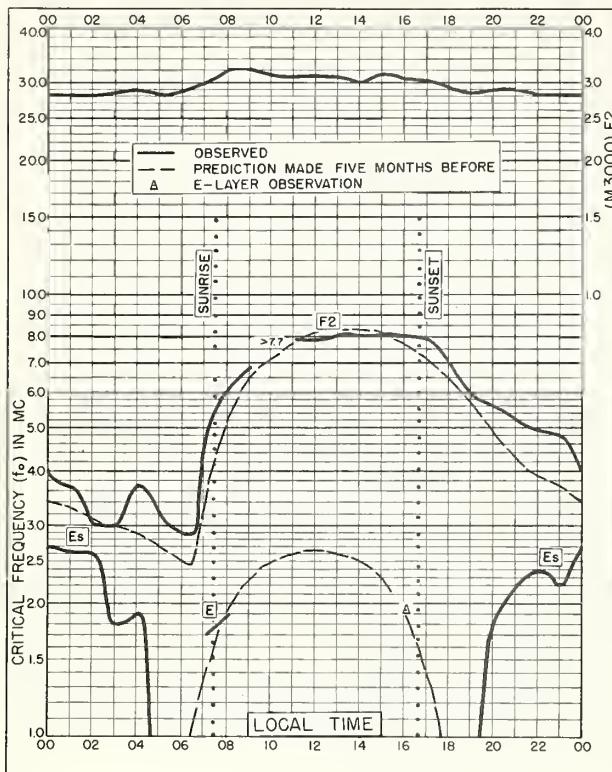


Fig. 80. MACQUARIE I.
54.5°S, 159.0°E AUGUST 1956

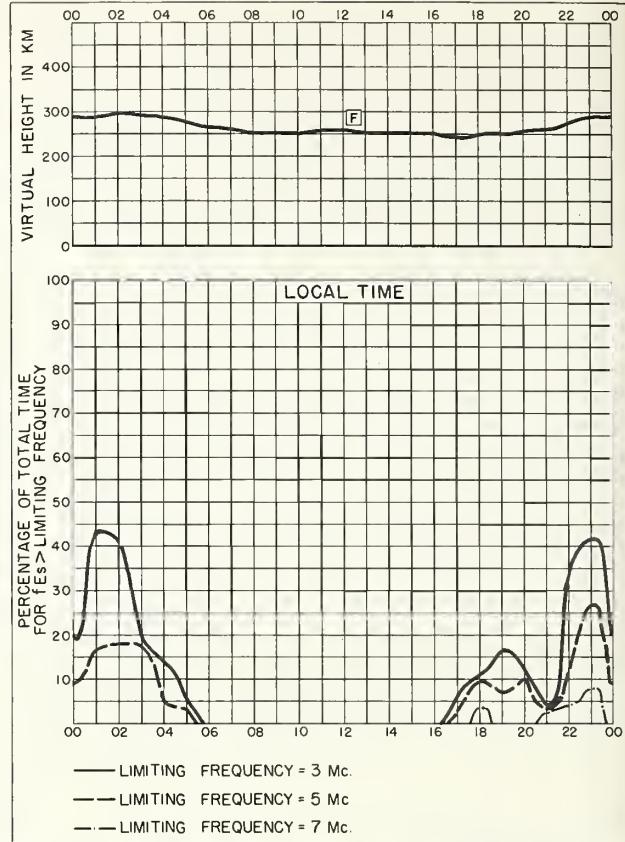


Fig. 81. MACQUARIE I. AUGUST 1956

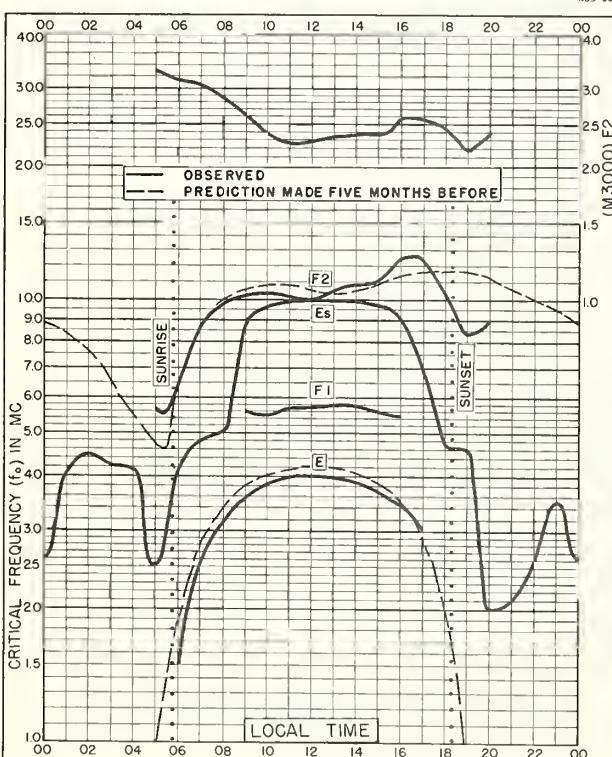


Fig. 82. DJIBOUTI, FRENCH SOMALILAND
11.5°N, 43.1°E JULY 1956

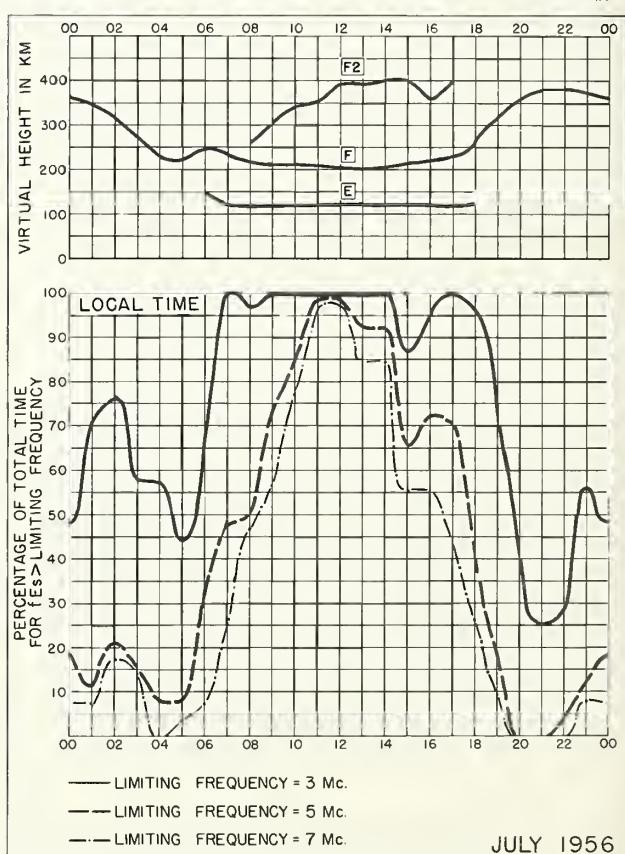
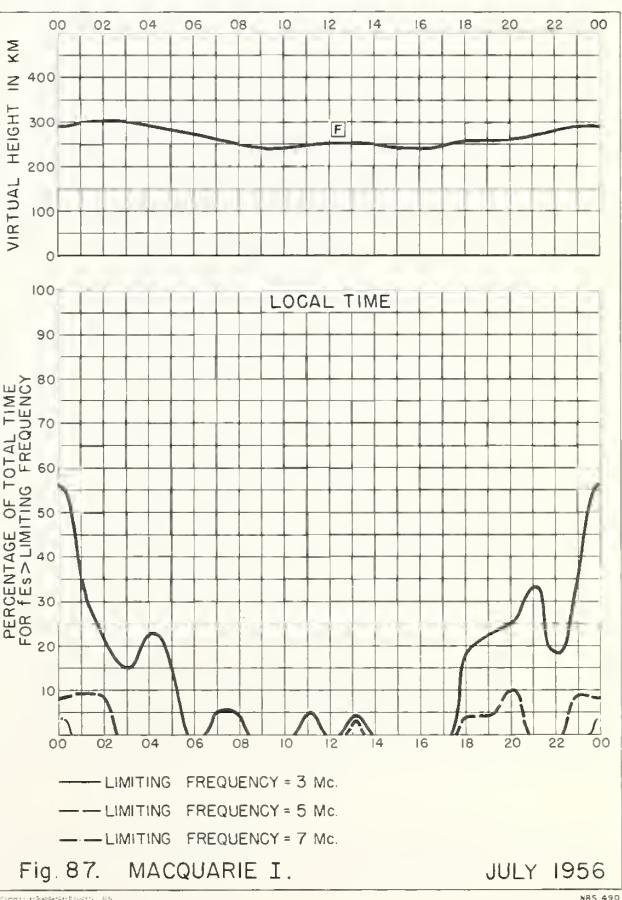
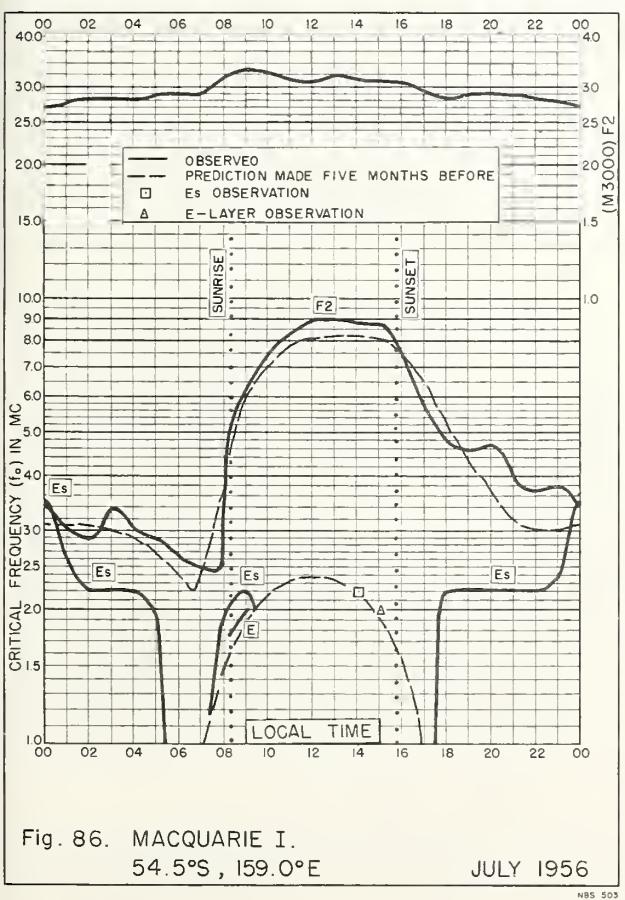
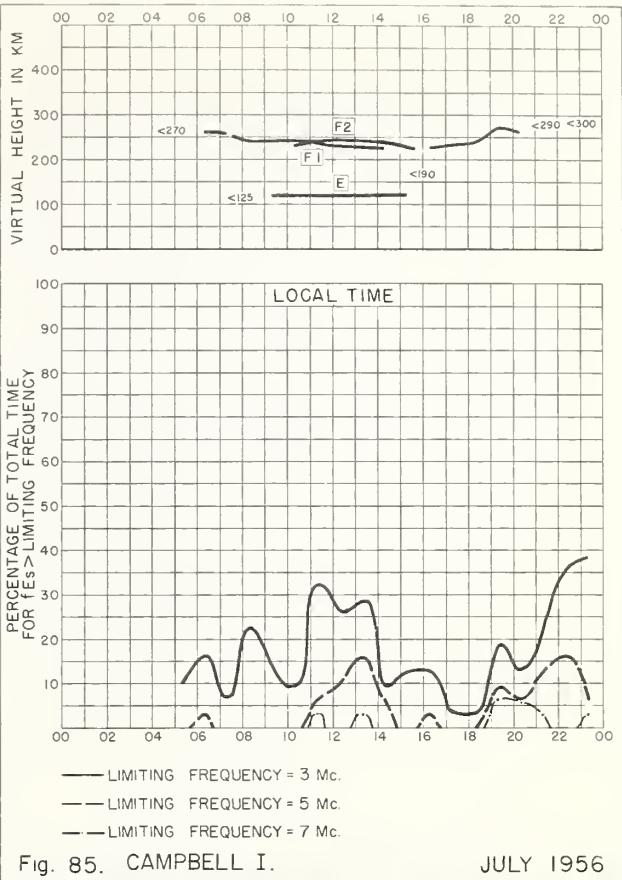
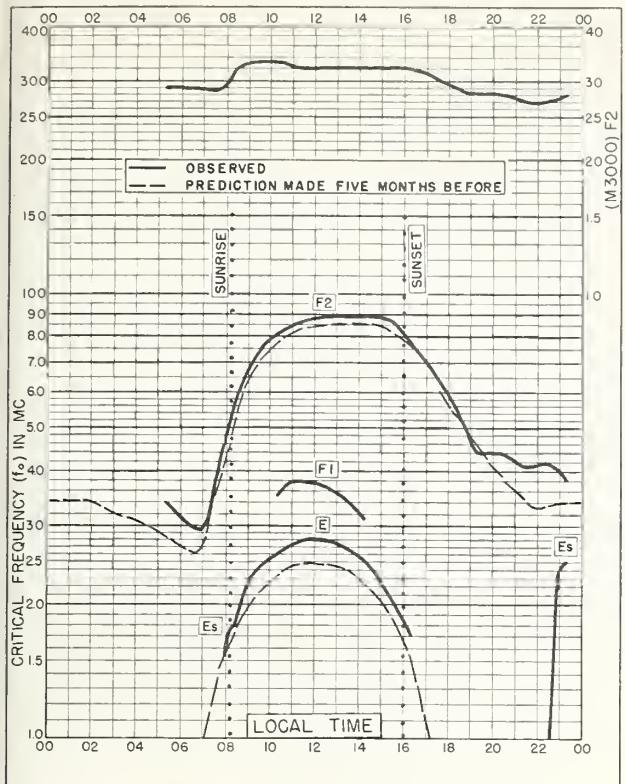


Fig. 83. DJIBOUTI, FRENCH SOMALILAND JULY 1956



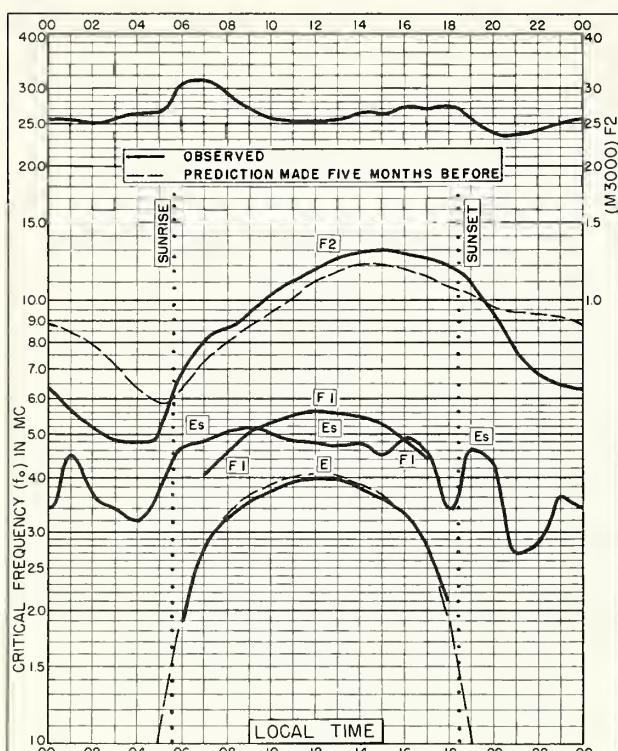


Fig. 88. DAKAR, FRENCH W. AFRICA
14.7°N, 17.4°W JUNE 1956

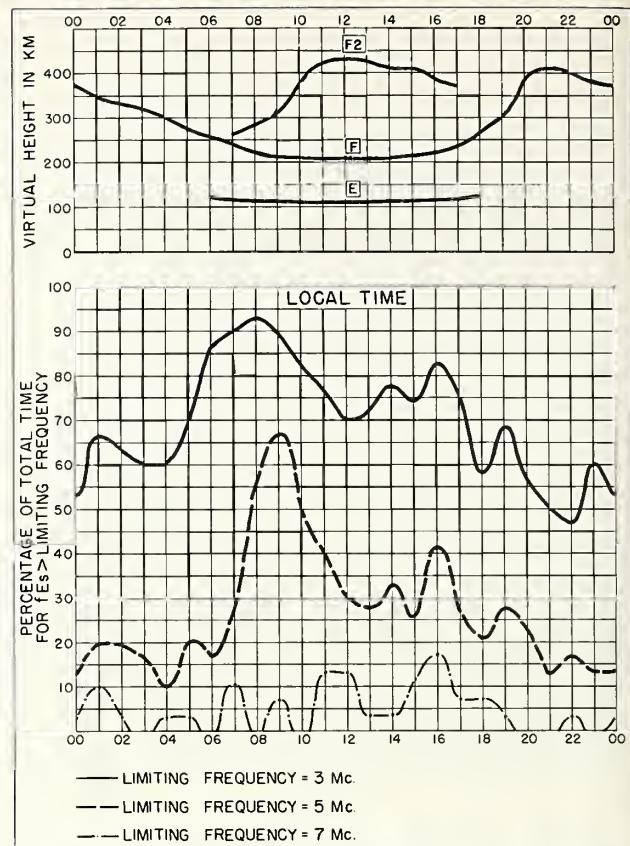


Fig. 89. DAKAR, FRENCH W. AFRICA JUNE 1956

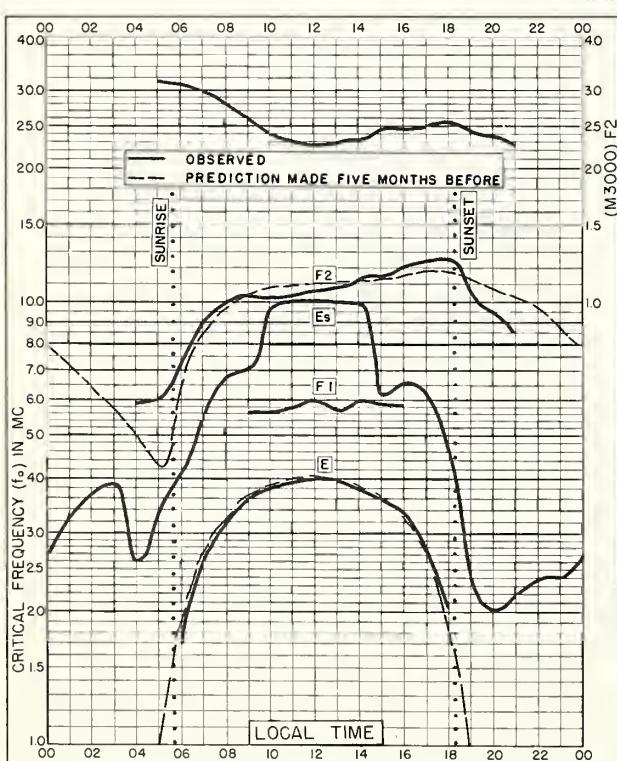


Fig. 90. DJIBOUTI, FRENCH SOMALILAND
11.5°N, 43.1°E JUNE 1956

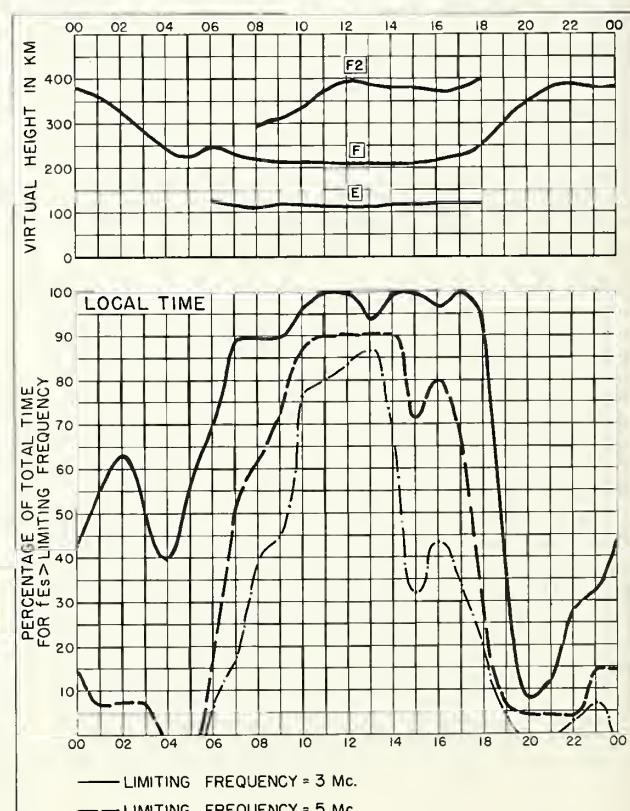


Fig. 91. DJIBOUTI, FRENCH SOMALILAND JUNE 1956

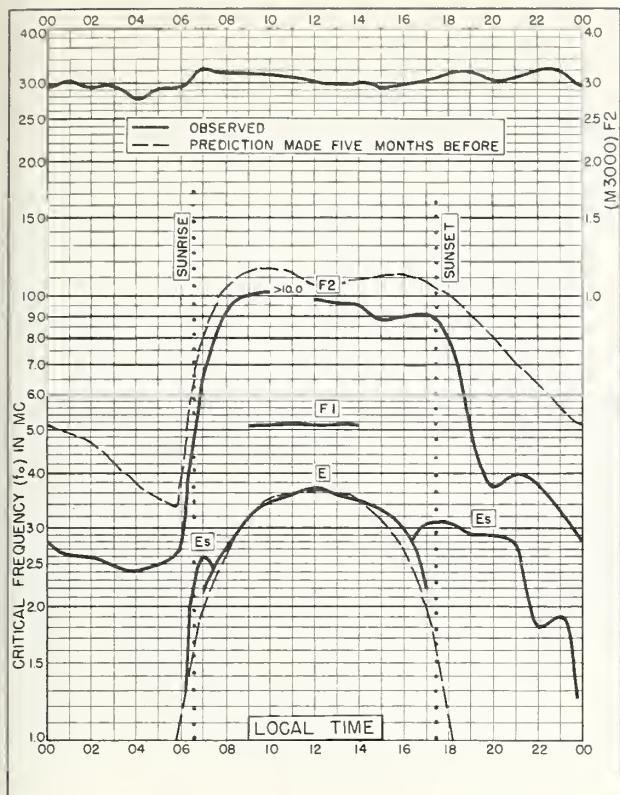


Fig. 92. TANANARIVE, MADAGASCAR
18.9°S, 47.6°E JUNE 1956

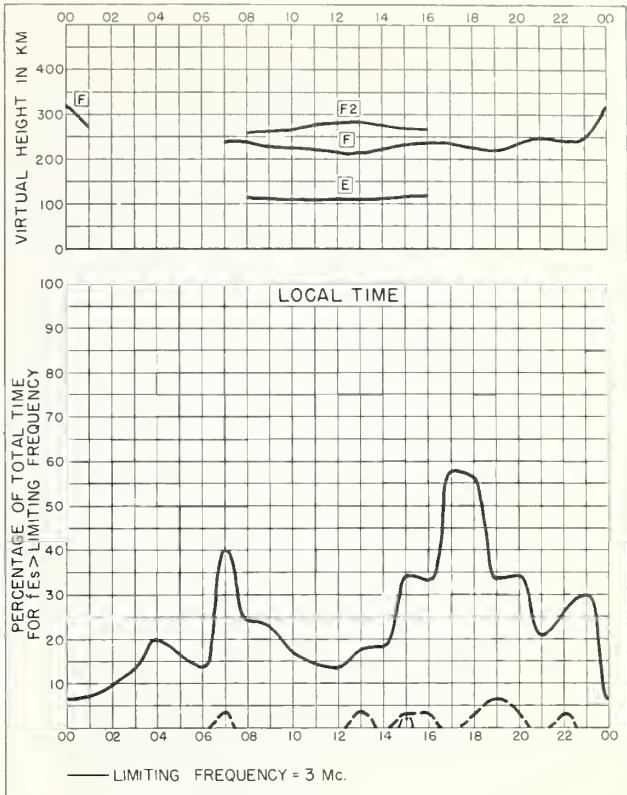


Fig. 93. TANANARIVE, MADAGASCAR JUNE 1956

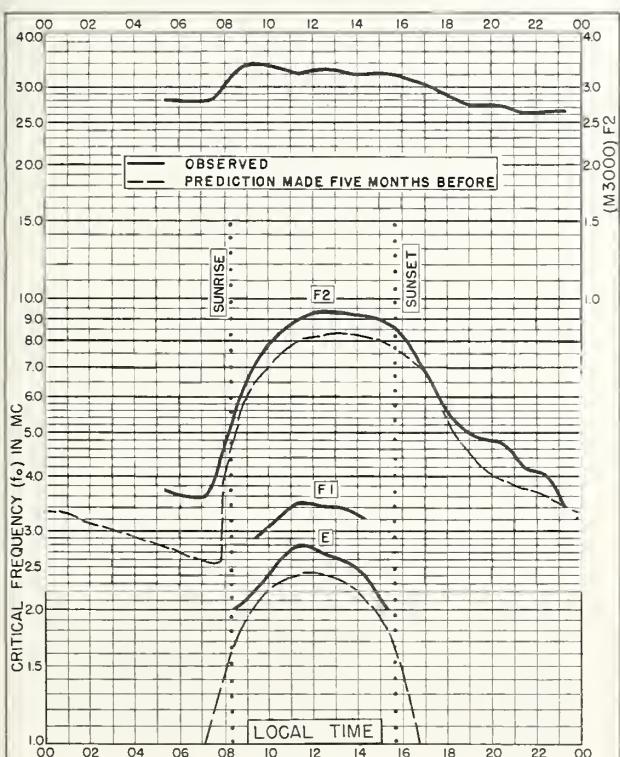


Fig. 94. CAMPBELL I.
52.5°S, 169.2°E JUNE 1956

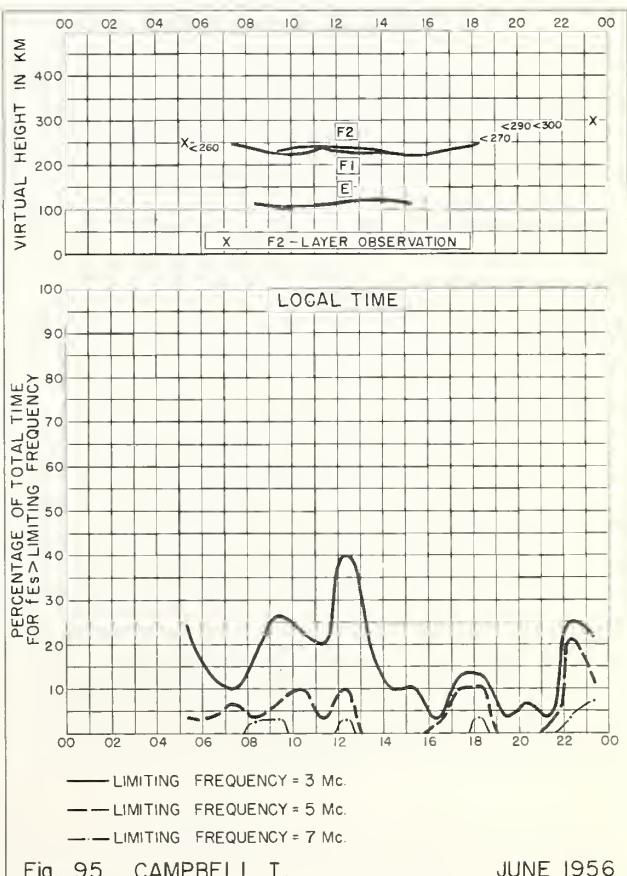
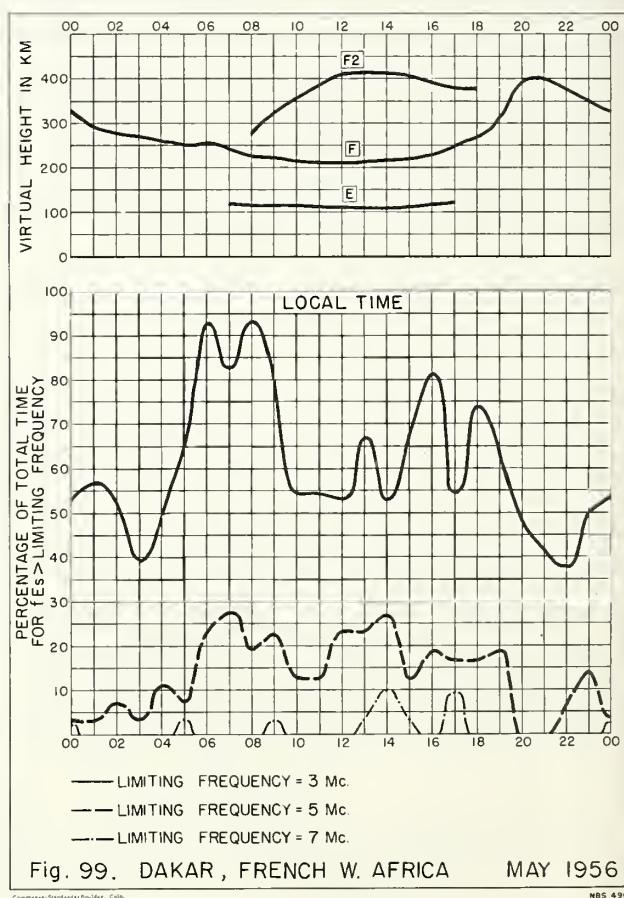
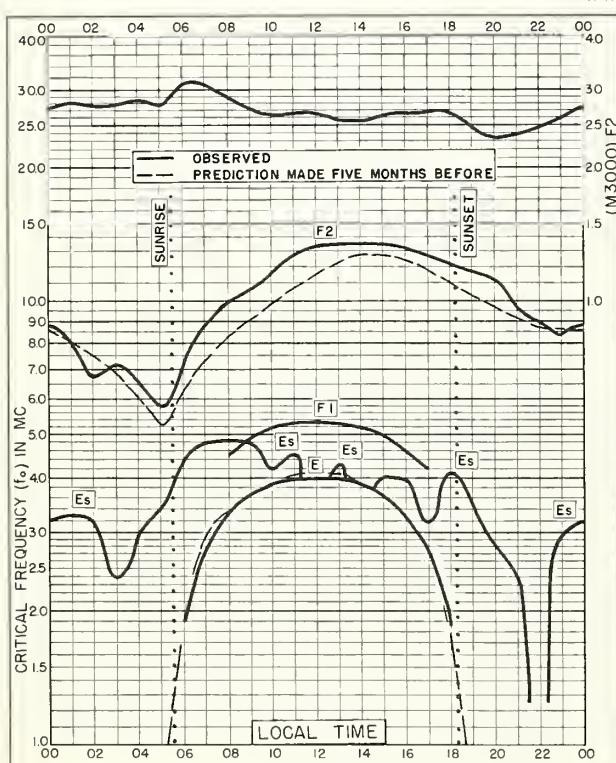
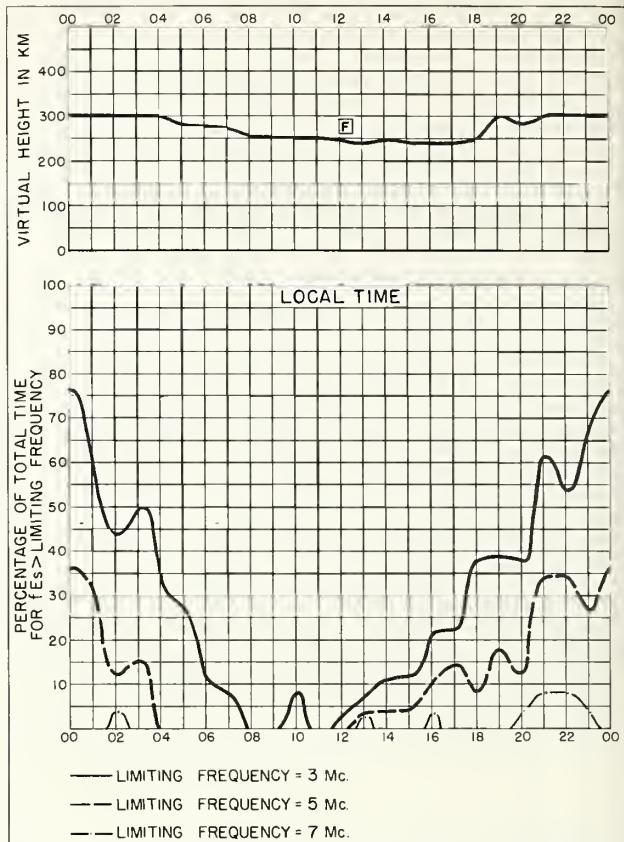
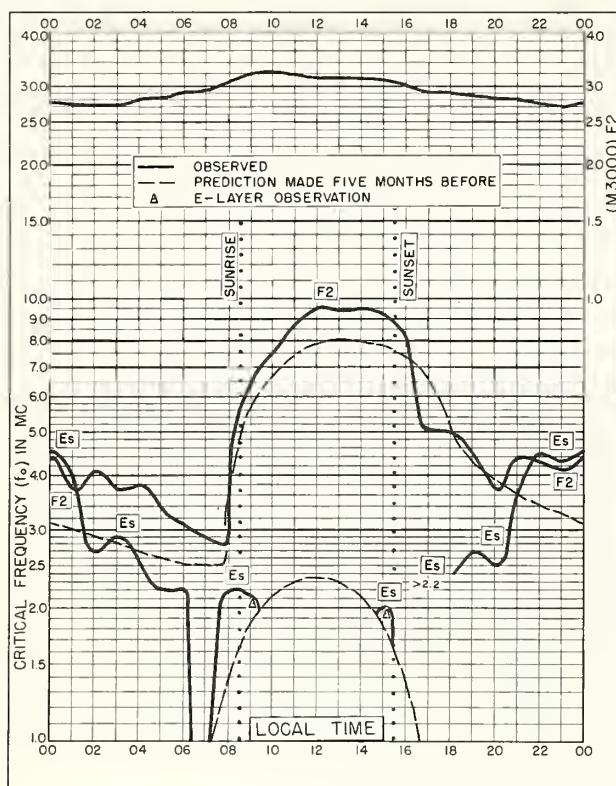


Fig. 95. CAMPBELL I. JUNE 1956



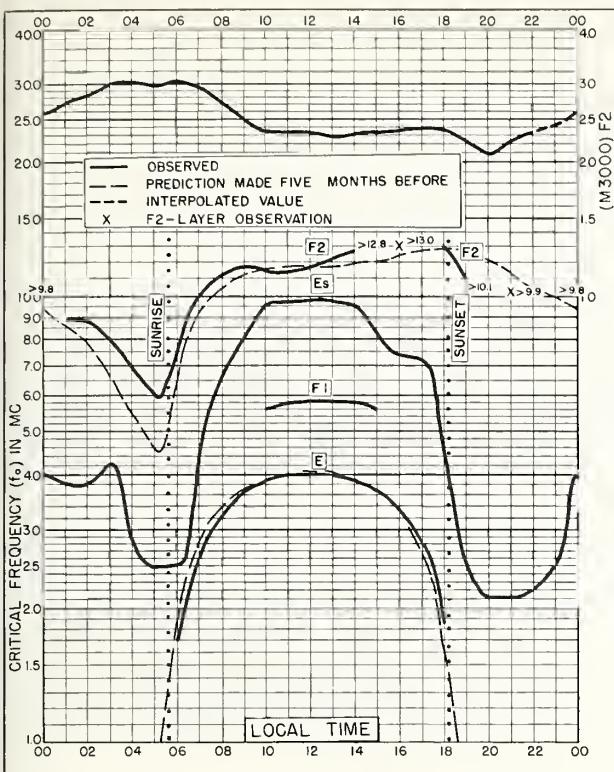


Fig. 100. DJIBOUTI, FRENCH SOMALILAND
11.5°N, 43.1°E MAY 1956

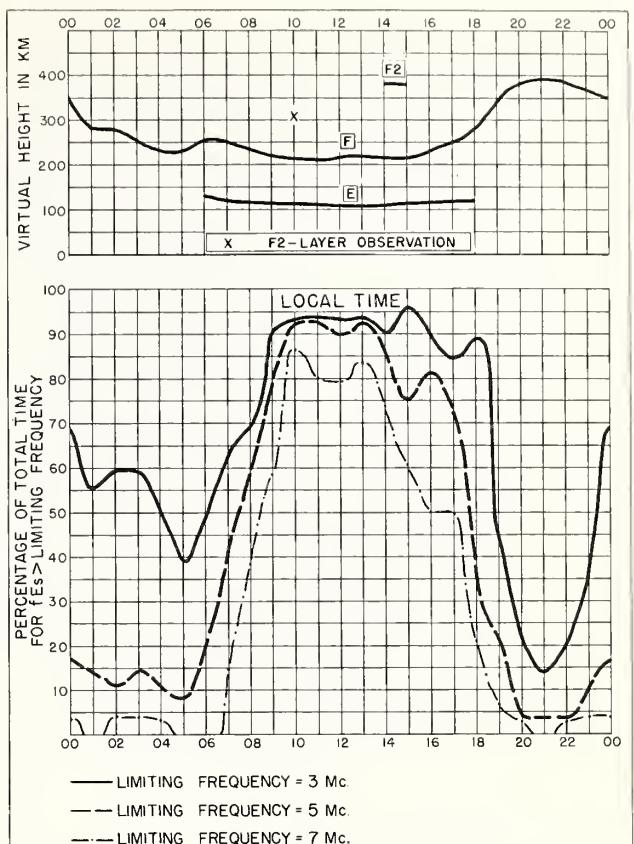


Fig. 101. DJIBOUTI, FRENCH SOMALILAND MAY 1956

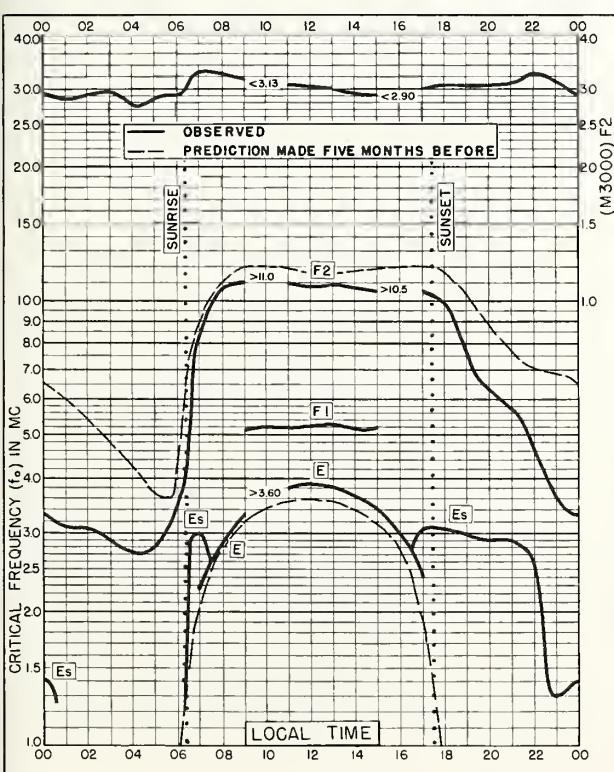


Fig. 102. TANANARIVE, MADAGASCAR
18.9°S, 47.6°E MAY 1956

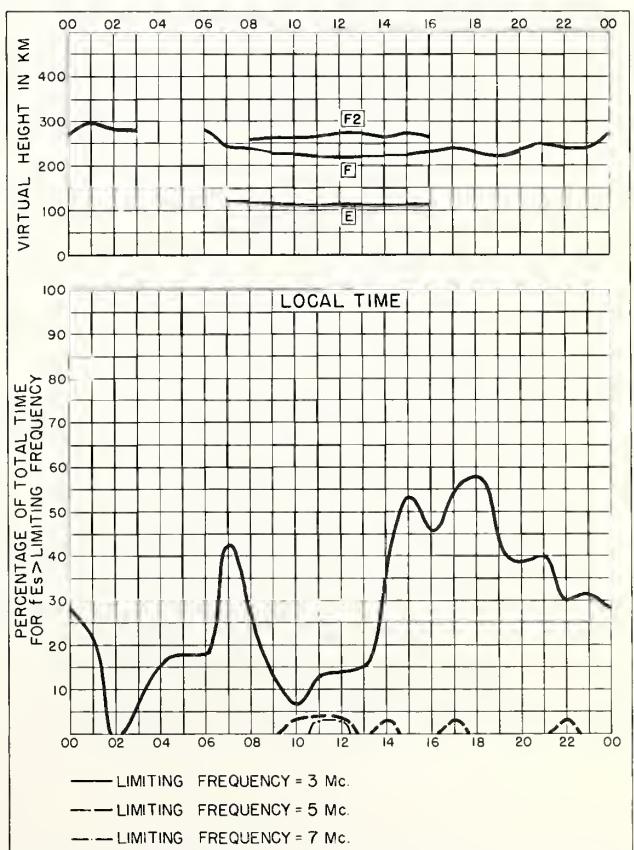
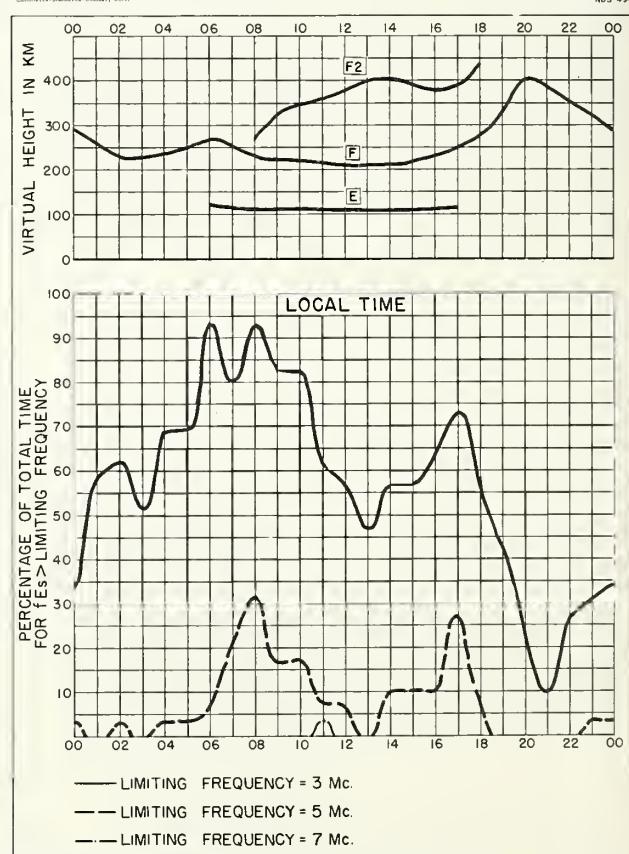
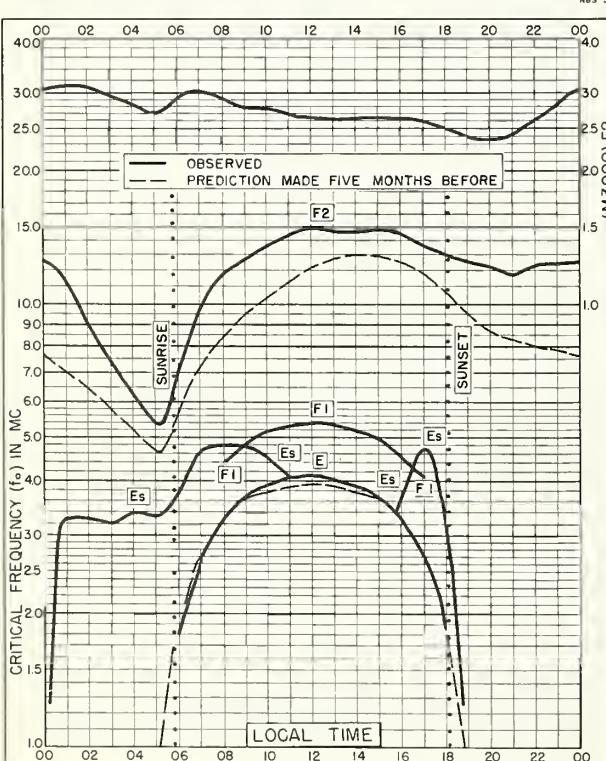
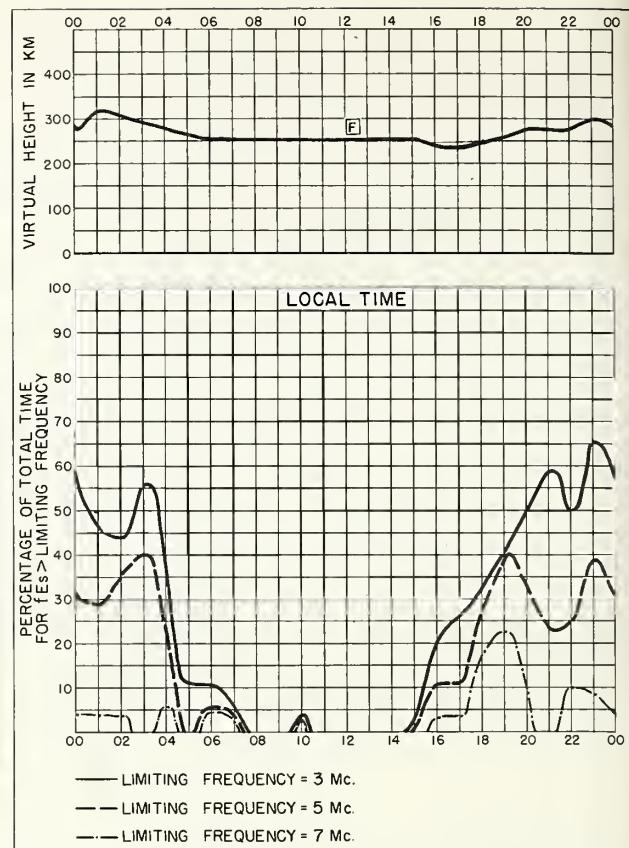
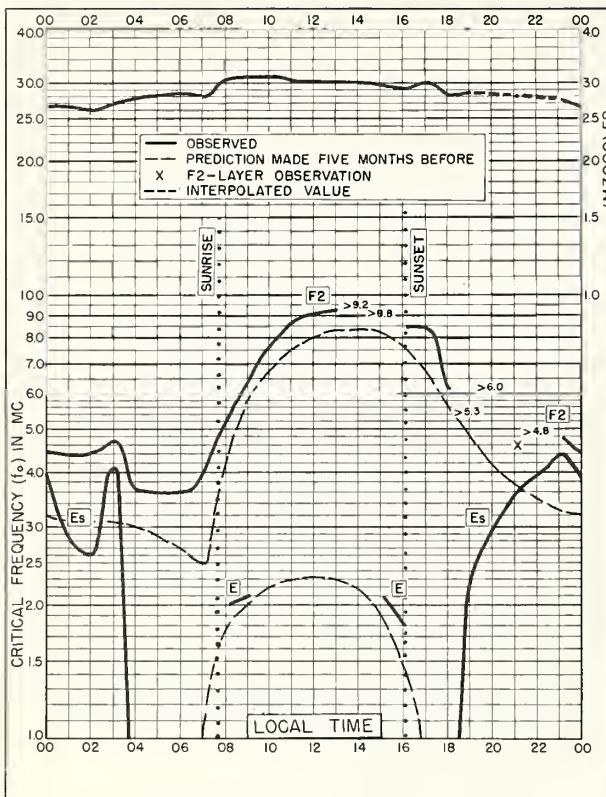
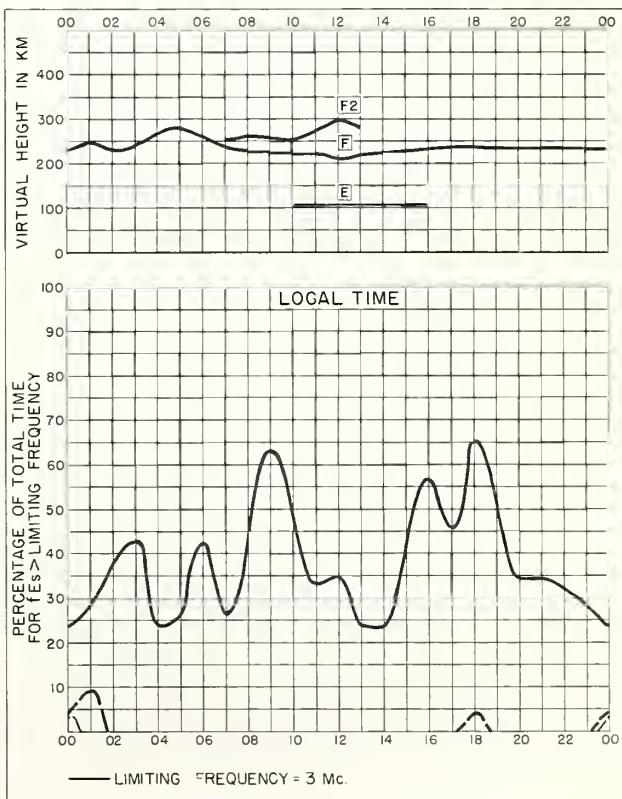
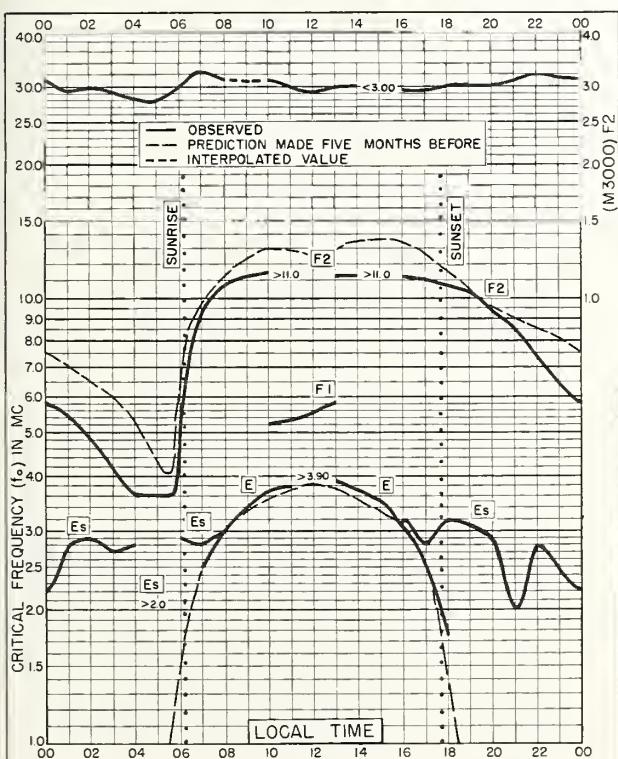
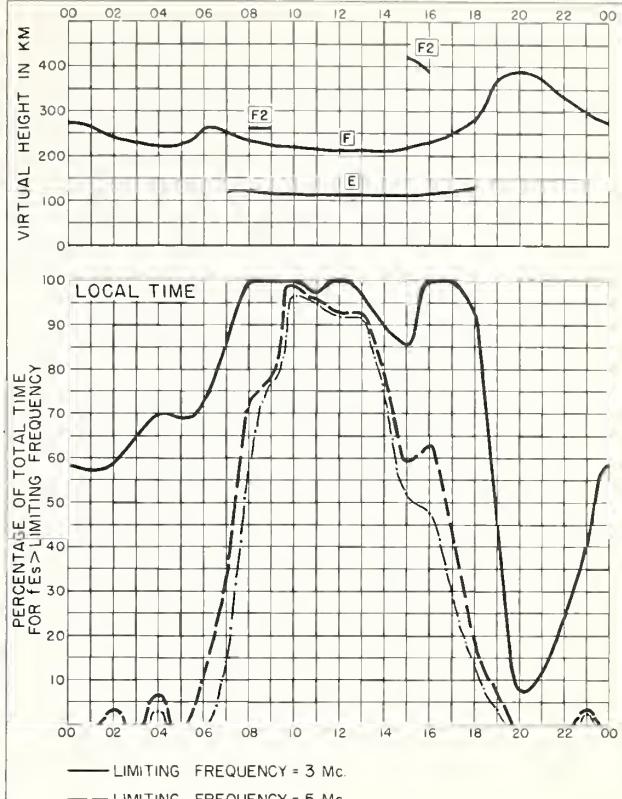
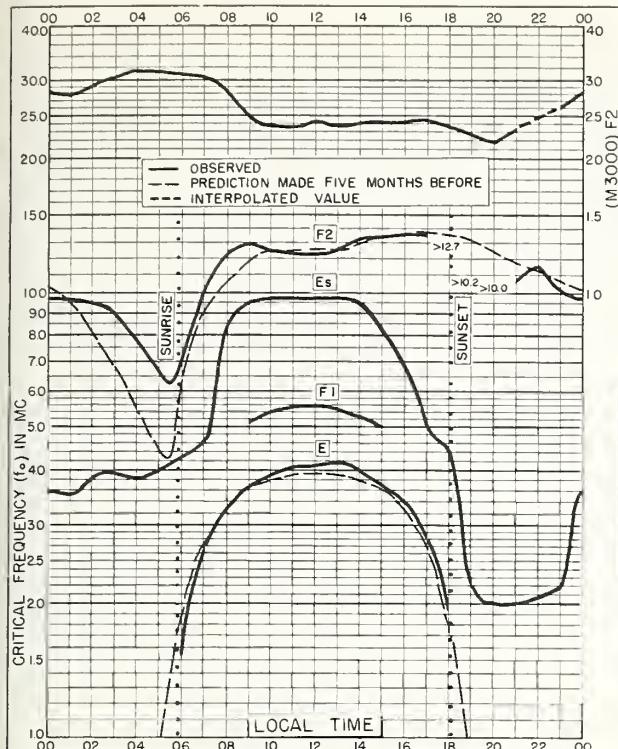
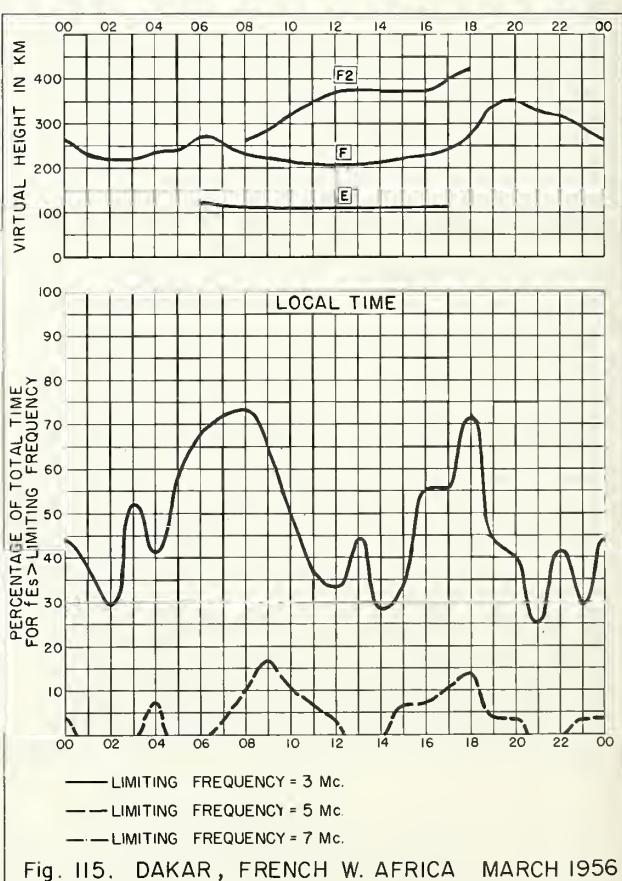
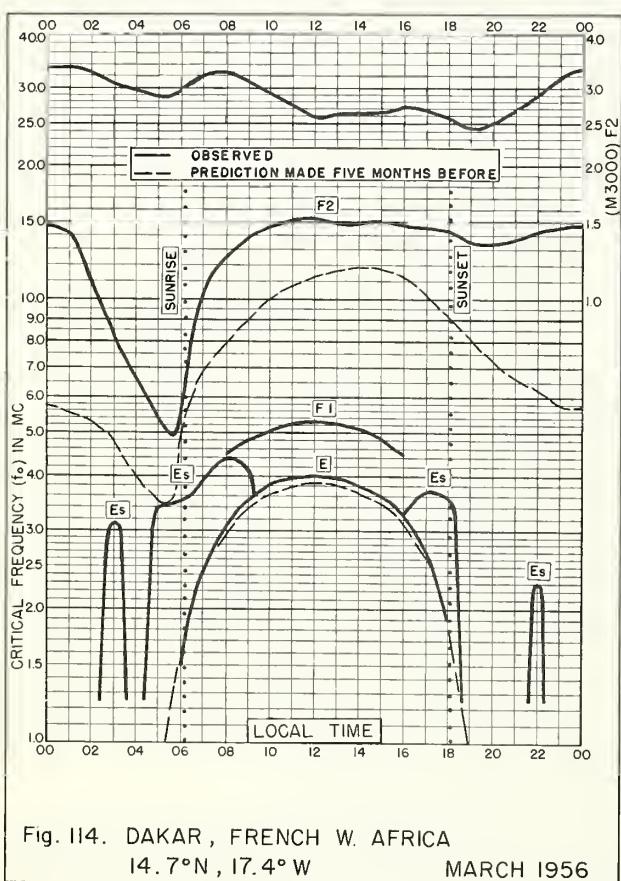
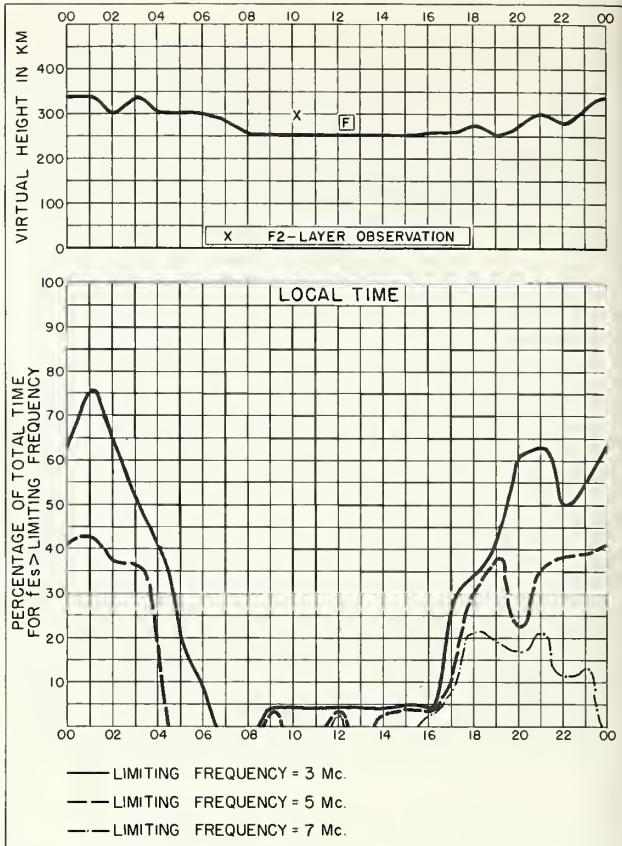
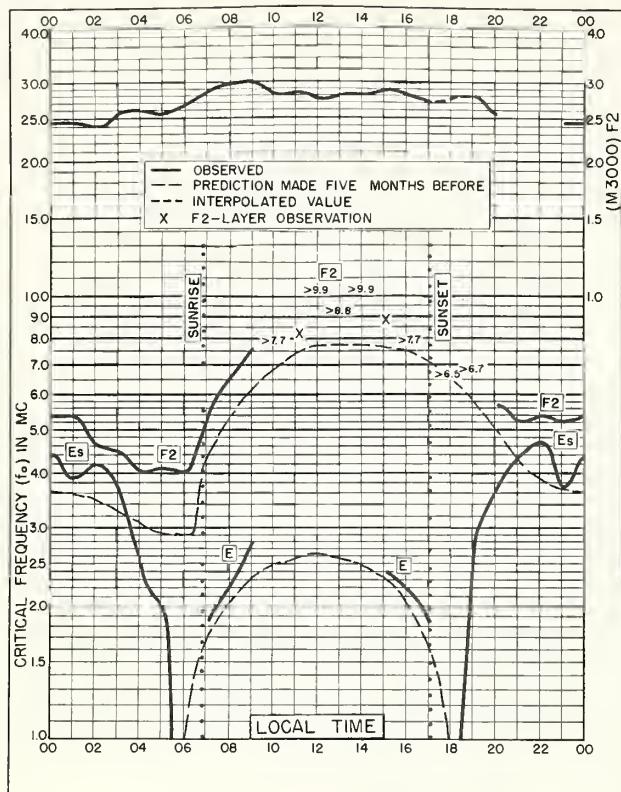


Fig. 103. TANANARIVE, MADAGASCAR MAY 1956







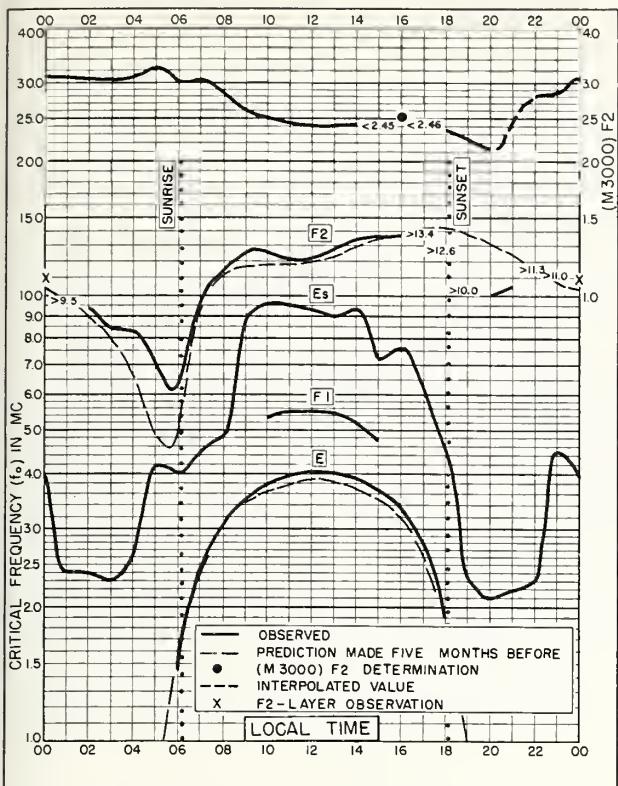


Fig. 116. DJIBOUTI, FRENCH SOMALILAND
II. 5°N, 43.1°E MARCH 1956

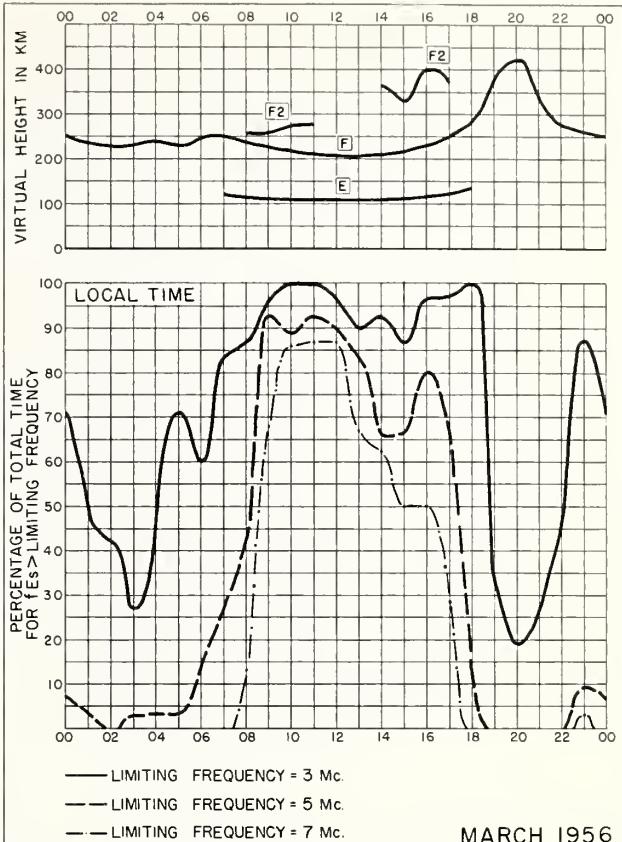


Fig. 117. DJIBOUTI, FRENCH SOMALILAND MARCH 1956

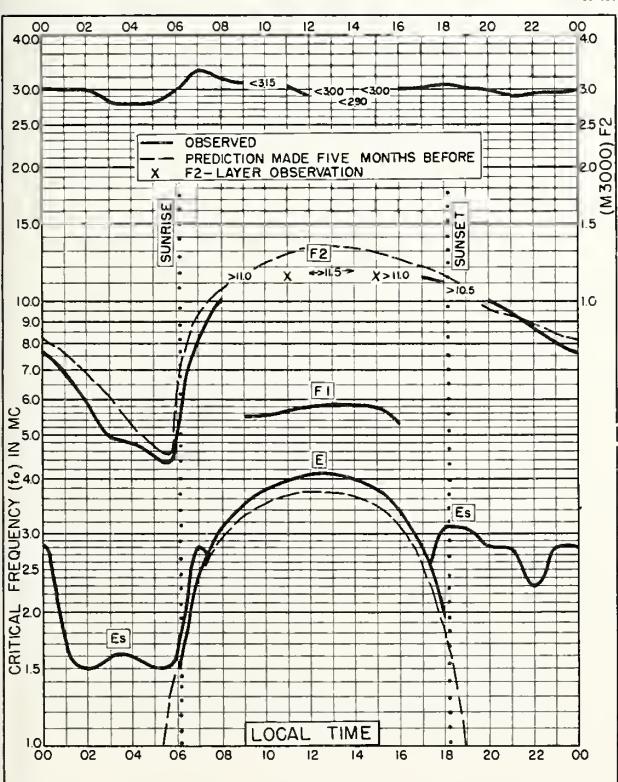


Fig. 118. TANANARIVE, MADAGASCAR
18.9°S, 47.6°E MARCH 1956

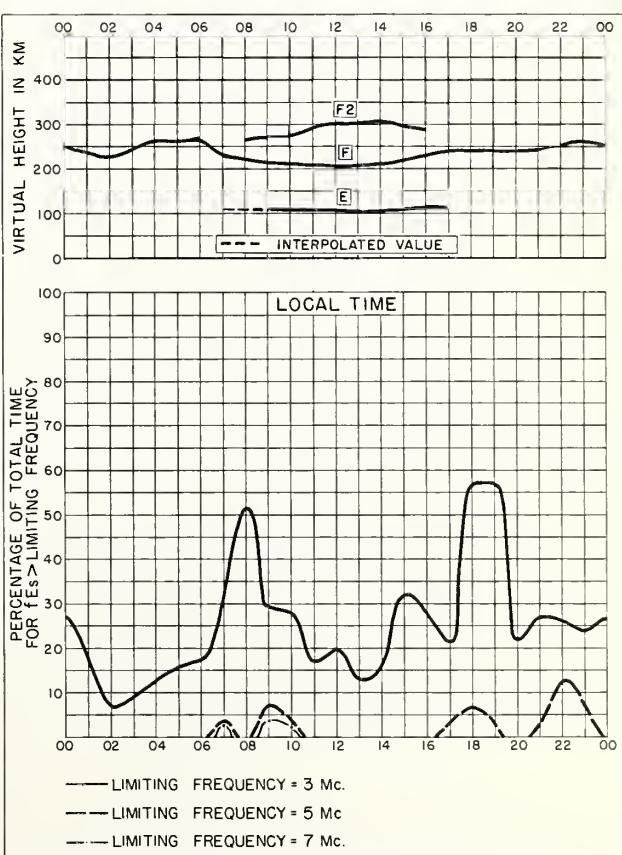


Fig. 119. TANANARIVE, MADAGASCAR MARCH 1956

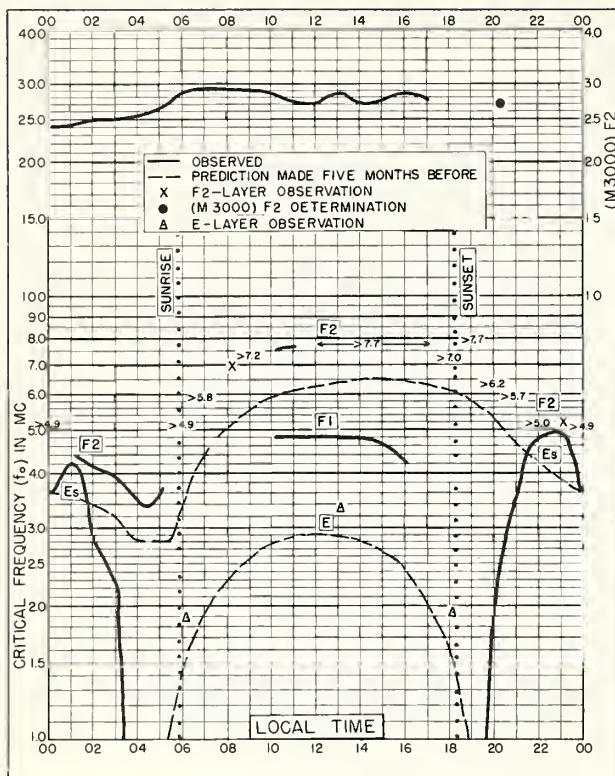


Fig. 120. MACQUARIE I.

54.5°S, 159.0°E

MARCH 1956

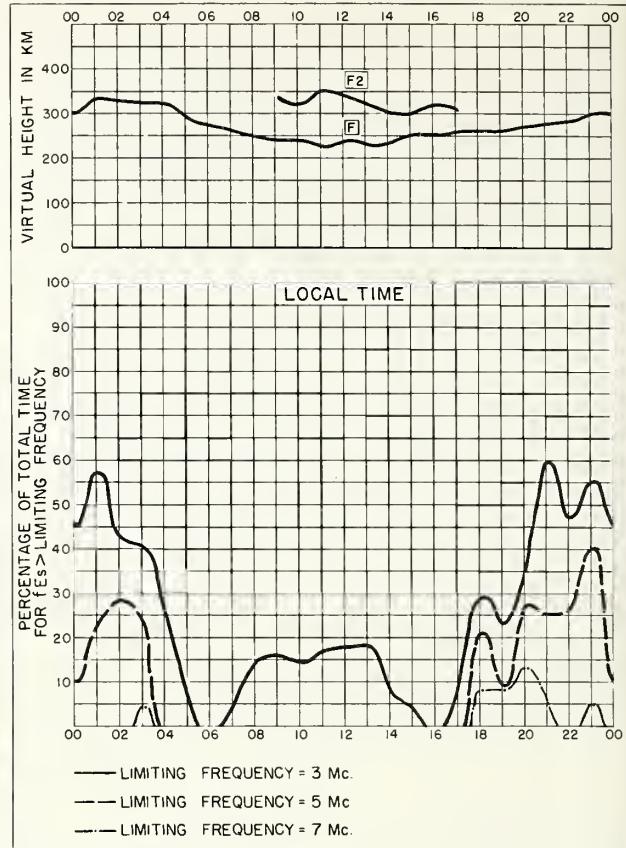


Fig. 121. MACQUARIE I.

MARCH 1956

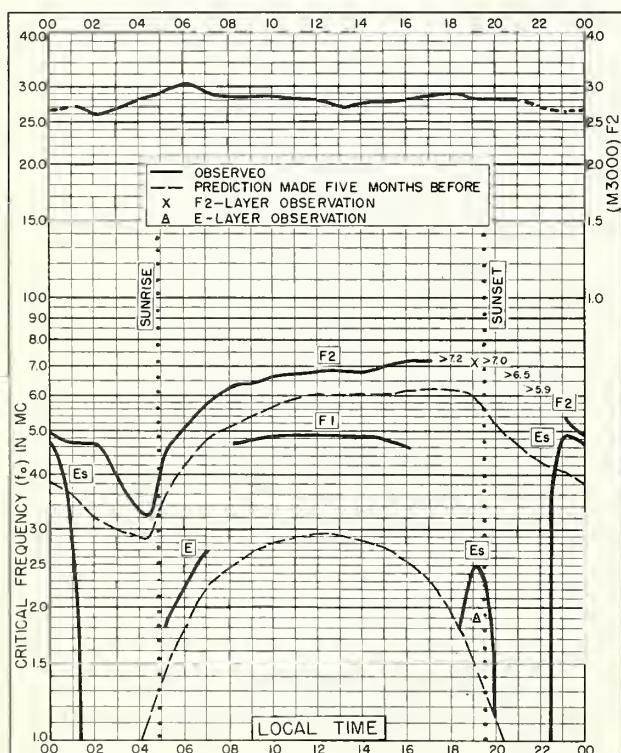


Fig. 122. MACQUARIE I.

54.5°S, 159.0°E

FEBRUARY 1956

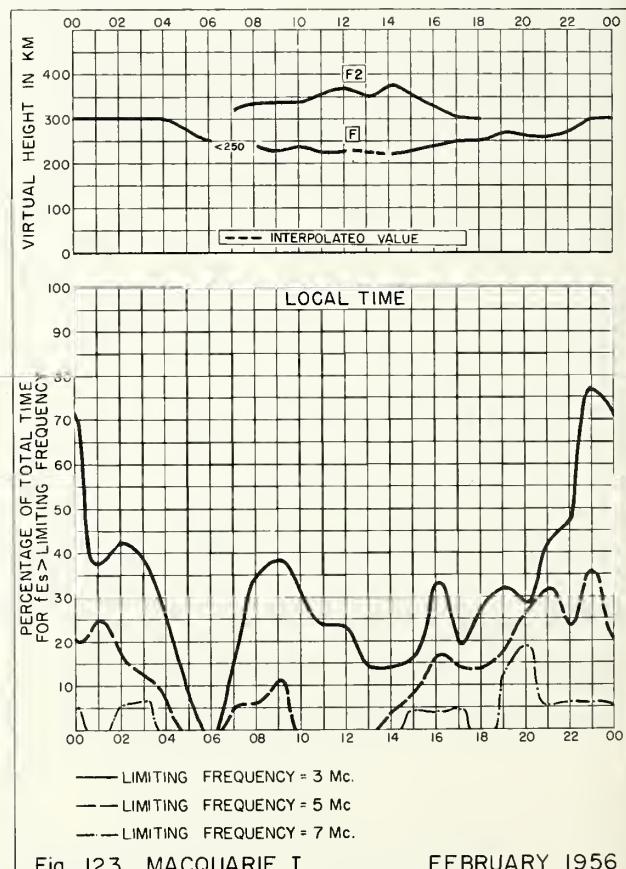
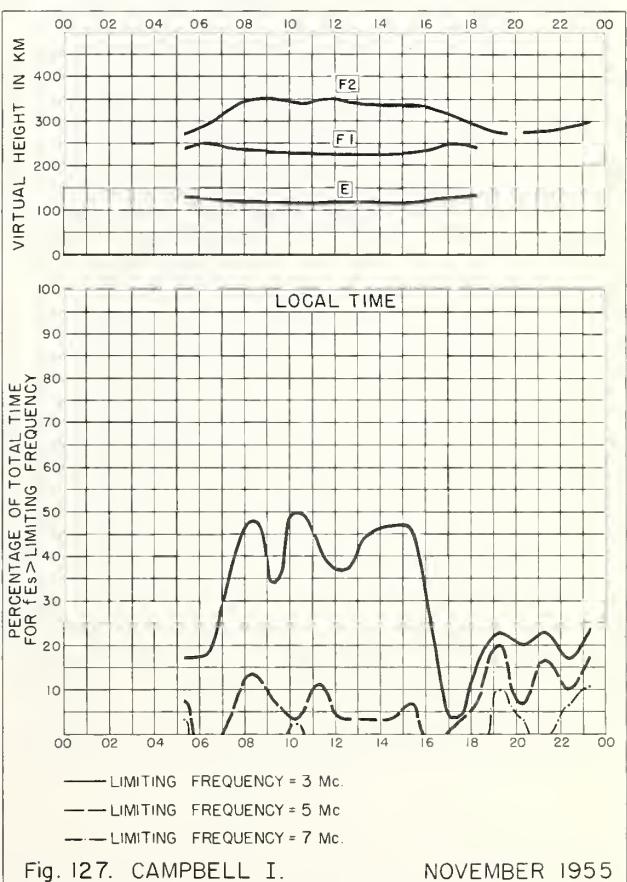
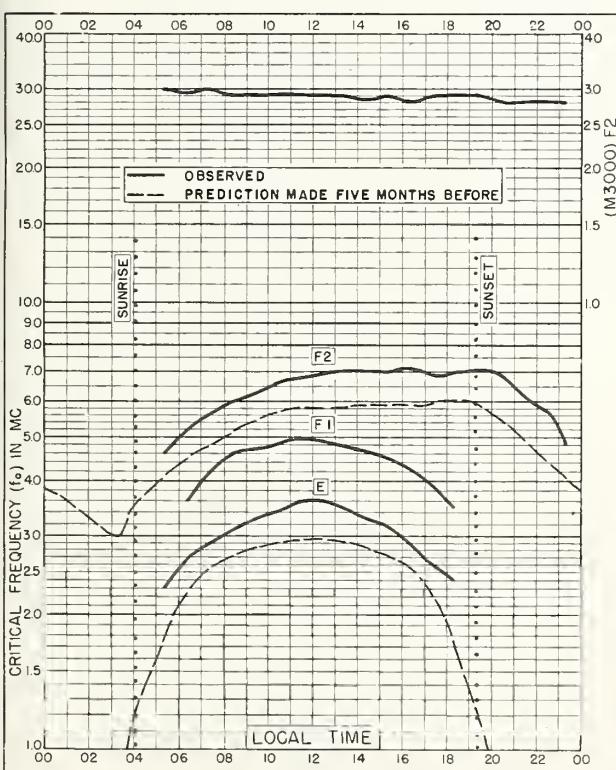
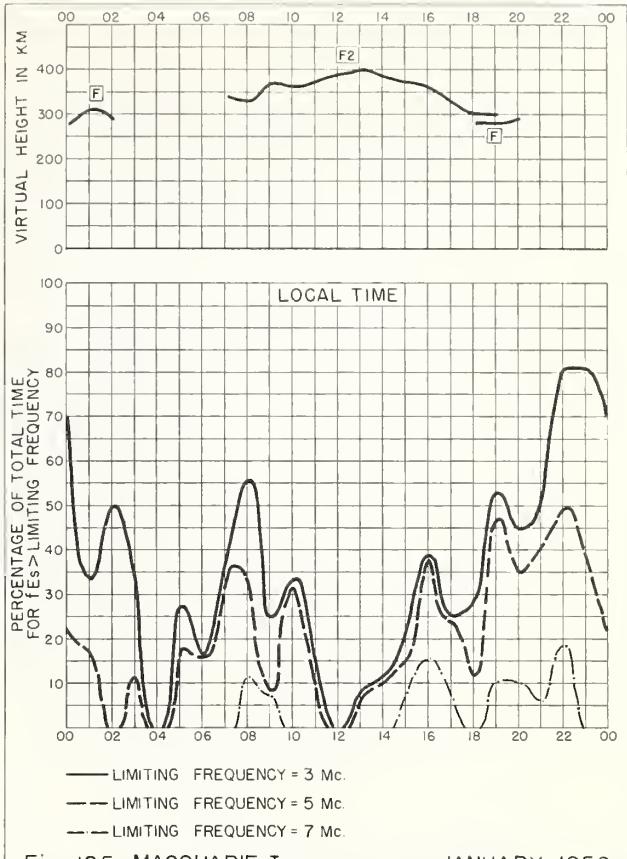
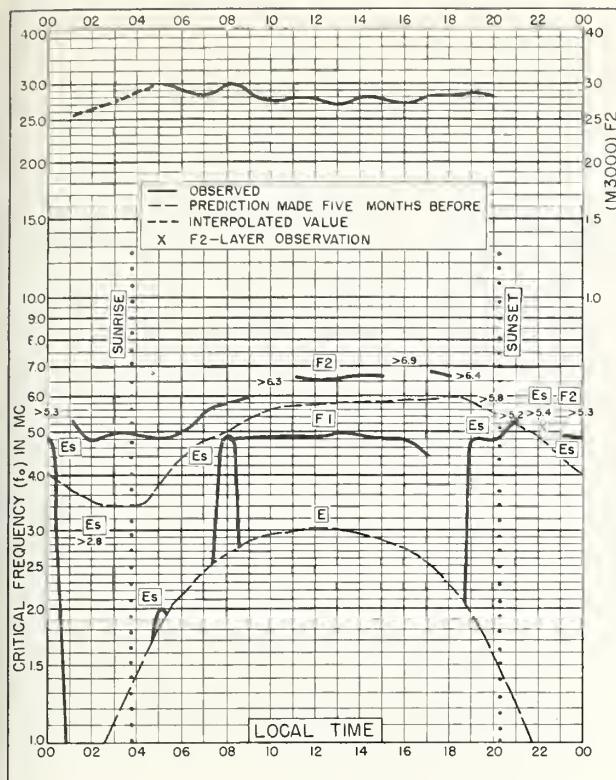


Fig. 123. MACQUARIE I.

FEBRUARY 1956



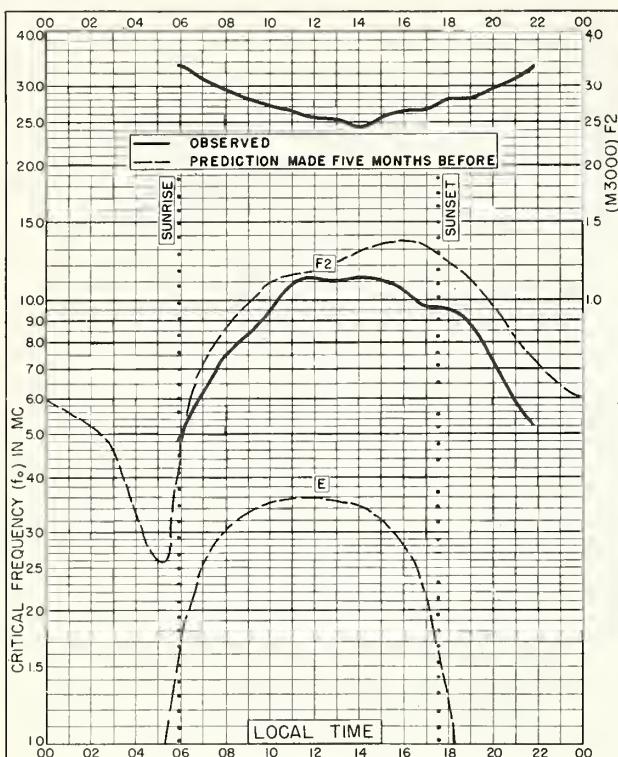


Fig. 128. BOMBAY, INDIA
19.0°N, 73.0°E OCTOBER 1955

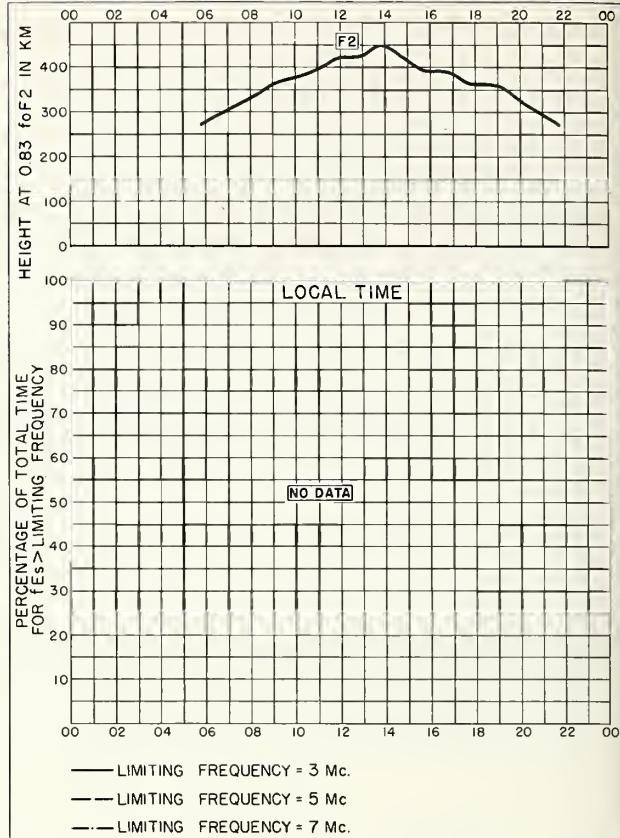


Fig. 129. BOMBAY, INDIA OCTOBER 1955

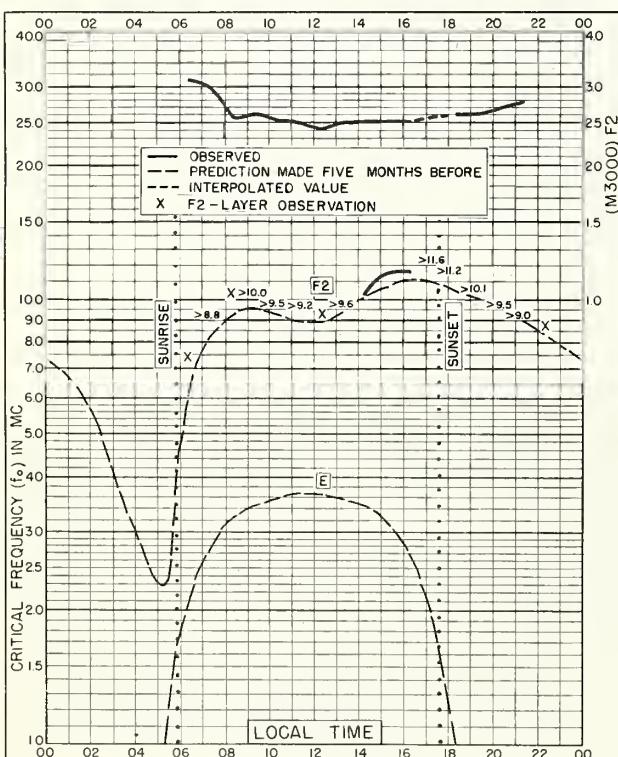


Fig. 130. MADRAS, INDIA
13.0°N, 80.2°E OCTOBER 1955

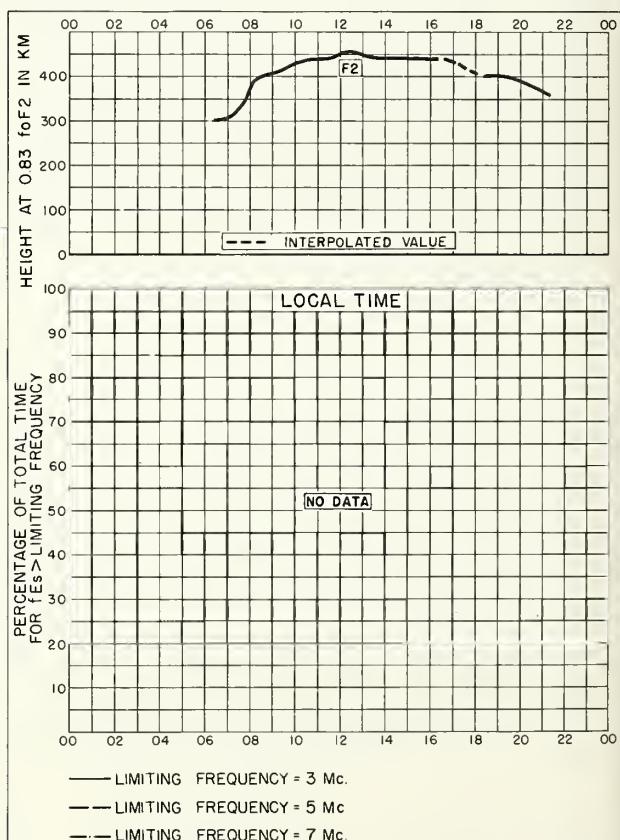


Fig. 131. MADRAS, INDIA OCTOBER 1955

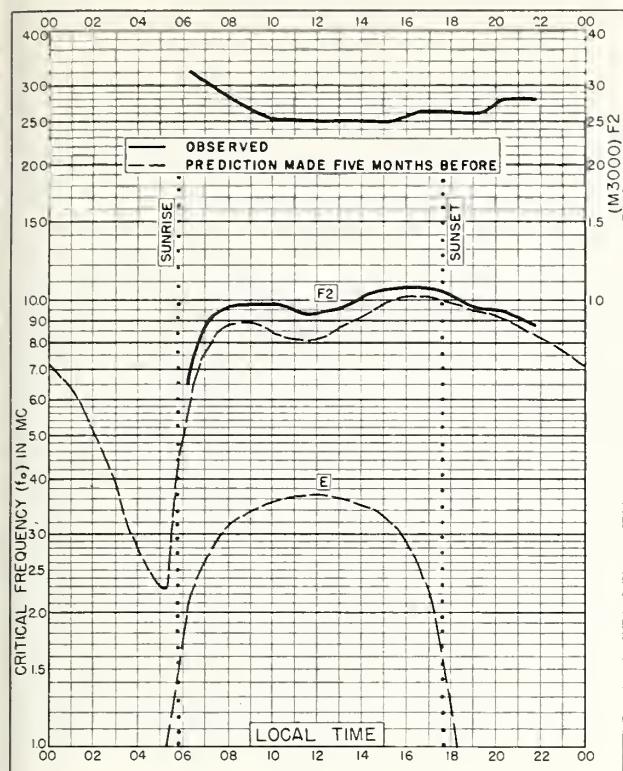


Fig. 132. TIRUCHY, INDIA
10.8°N, 78.8°E OCTOBER 1955

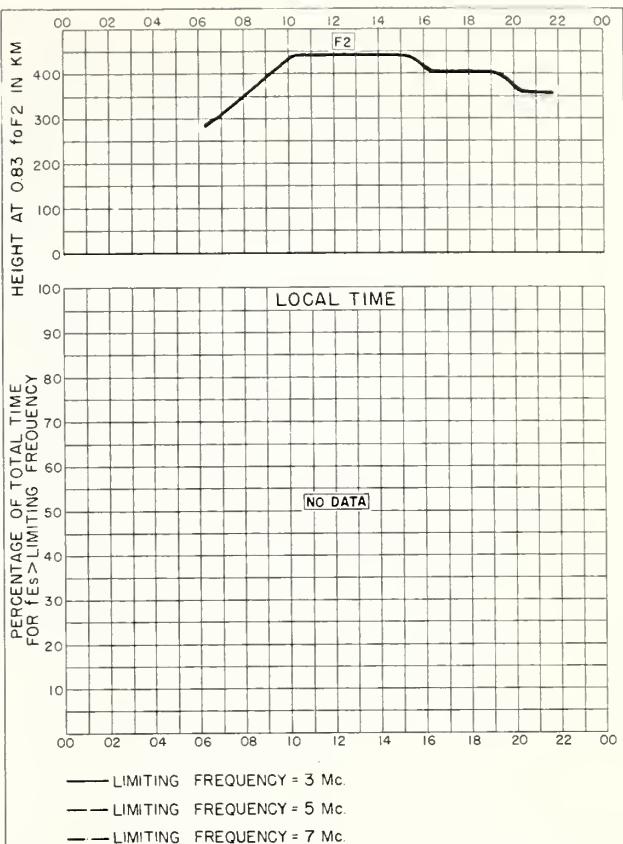


Fig. 133. TIRUCHY, INDIA OCTOBER 1955

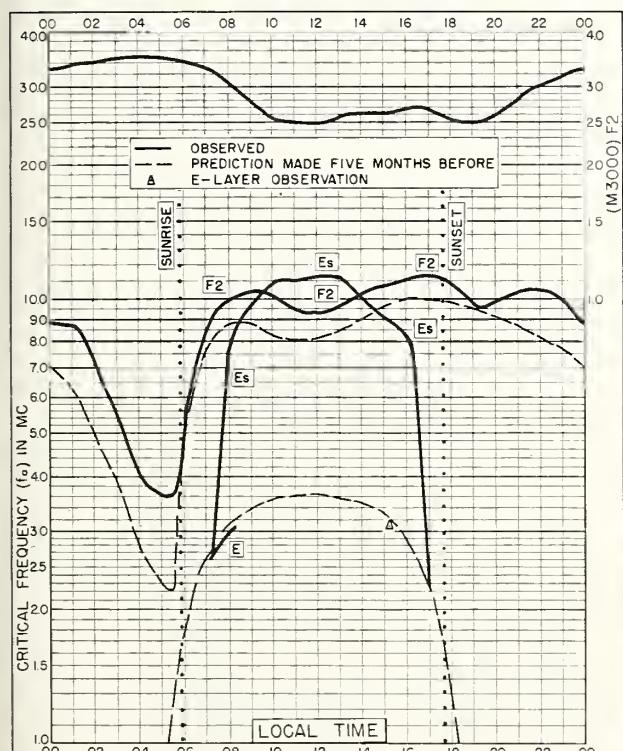


Fig. 134. KODAIKANAL, INDIA
10.2°N, 77.5°E OCTOBER 1955

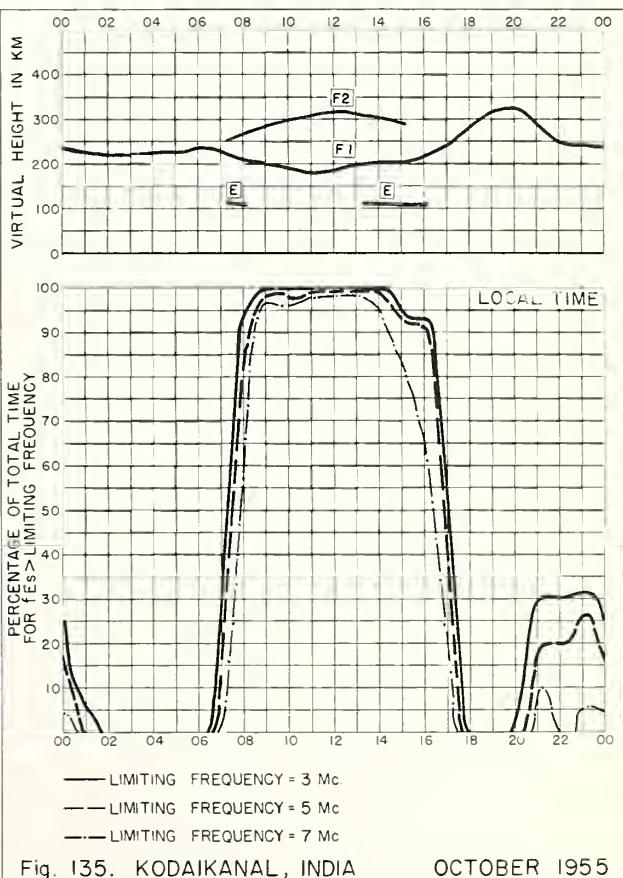


Fig. 135. KODAIKANAL, INDIA OCTOBER 1955

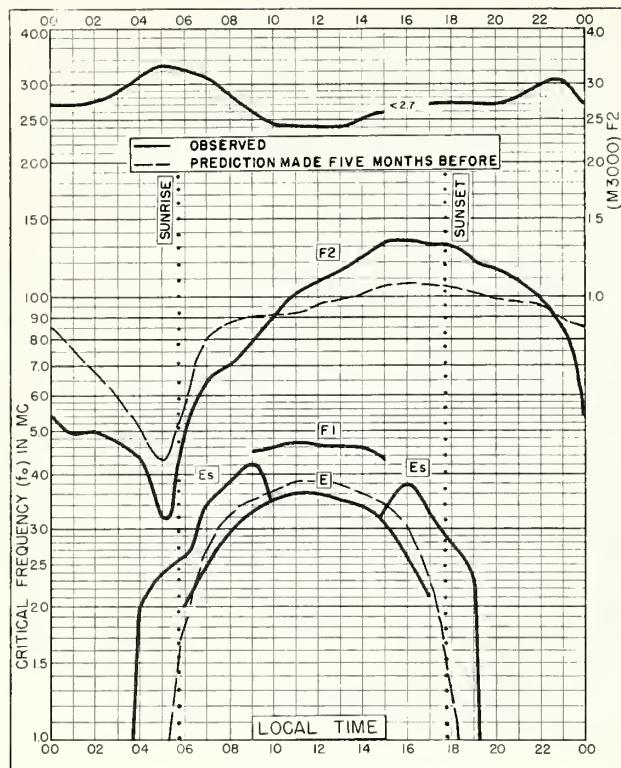


Fig. 136. LEOPOLDVILLE, BELGIAN CONGO
4.3°S, 15.3°E OCTOBER 1952

NBS 503

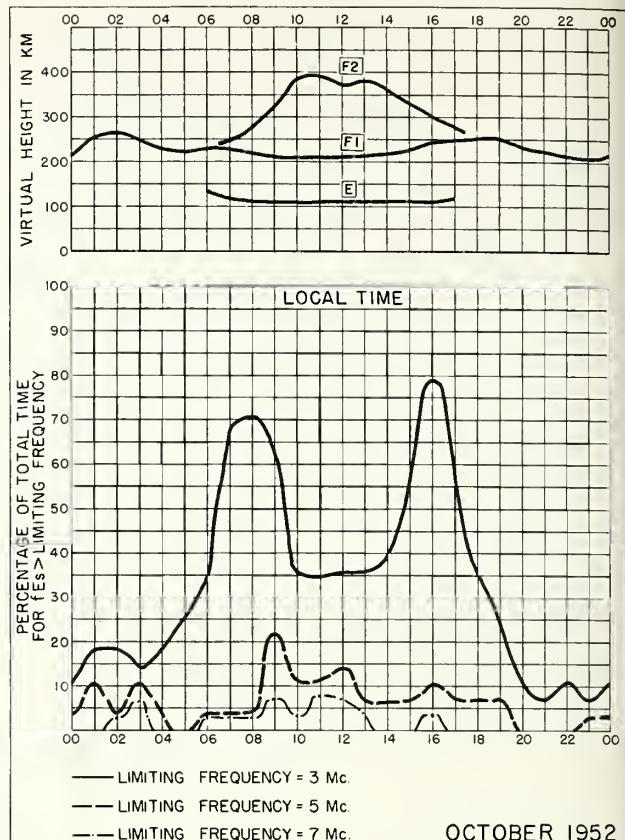


Fig. 137. LEOPOLDVILLE, BELGIAN CONGO

OCTOBER 1952

NBS 490

Index of Tables and Graphs of Ionospheric Datain CRPL-F175 (Part A)

	<u>Table page</u>	<u>Figure page</u>
Adak, Alaska		
November 1958	1	14
Alert, Canada		
September 1957.	6	30
Anchorage, Alaska		
December 1958	1	13
Bombay, India		
October 1955.	12	46
Campbell I.		
July 1956	8	35
June 1956	9	37
November 1955	12	45
Cape Canaveral, Florida		
July 1958	4	24
Cape Hallett		
August 1957	6	30
Chimbote, Peru		
August 1958	3	20
Christchurch, New Zealand		
August 1958	4	22
Dakar, French W. Africa		
June 1956	8	36
May 1956.	9	38
April 1956.	10	40
March 1956.	11	42
De Bilt, Holland		
August 1958	2	17
Djibouti, French Somaliland		
July 1956	8	34
June 1956	9	36
May 1956.	9	39
April 1956.	10	41
March 1956.	11	43
Fletchers Ice I.		
August 1958	2	16
Ft. Monmouth, New Jersey		
September 1958.	2	16
Godhavn, Greenland		
September 1958.	1	15
Grand Bahama I.		
August 1958	3	19
Graz, Austria		
August 1958	2	18
Hobart, Tasmania		
August 1958	4	22

Index (CRPL-F175 (Part A), continued)

	<u>Table page</u>	<u>Figure page</u>
Kodaikanal, India		
October 1955.	12	47
La Paz, Bolivia		
August 1958	3	21
June 1958	5	25
May 1958.	5	26
April 1958.	5	27
March 1958.	6	28
February 1958	6	28
January 1958.	6	29
December 1957	6	29
Leopoldville, Belgian Congo		
October 1952.	12	48
Macquarie I.		
October 1956.	7	33
September 1956.	8	33
August 1956	8	34
July 1956	8	35
June 1956	9	38
May 1956.	10	40
April 1956.	10	42
March 1956.	11	44
February 1956	11	44
January 1956.	11	45
Madras, India		
October 1955.	12	46
Marion I.		
July 1957	7	31
Monte Capellino, Italy		
June 1958	5	25
May 1958.	5	26
April 1958.	5	27
July 1957	7	31
June 1957	7	32
May 1957.	7	32
April 1957.	7	32
Okinawa I.		
August 1958	3	19
Point Barrow, Alaska		
October 1958.	1	14
St. John's, Newfoundland		
August 1958	2	18
July 1958	4	23
Talara, Peru		
August 1958	3	20

Index (CRPL-F175 (Part A), concluded)

	<u>Table page</u>	<u>Figure page</u>
Tananarive, Madagascar		
June 1956	9	37
May 1956.	10	39
April 1956.	10	41
March 1956.	11	43
Thule, Greenland		
September 1958.	1	15
August 1958	2	17
July 1958	4	23
Tiruchi, India		
October 1955.	12	47
Townsville, Australia		
July 1958	4	24
Washington, D. C.		
December 1958	1	13
Watheroo, W. Australia		
August 1958	3	21



CRPL Reports

[A detailed list of CRPL publications is available from the Central Radio Propagation Laboratory upon request]

Daily:

Radio disturbance forecasts, every half hour from broadcast stations WWV and WWVH of the National Bureau of Standards.

Telephoned and telegraphed reports of ionospheric, solar, geomagnetic, and radio propagation data.

Semiweekly:

CRPL—J. North Atlantic Radio Propagation Forecast (of days most likely to be disturbed during following month).

CRPL—Jp. North Pacific Radio Propagation Forecast (of days most likely to be disturbed during following month).

Semimonthly:

CRPL—Ja. Semimonthly Frequency Revision Factors For CRPL Basic Radio Propagation Prediction Reports.

Monthly:

CRPL—D. Basic Radio Propagation Predictions—Three months in advance. (Dept. of the Army, TB 11-499, monthly supplements to TM 11-499; Dept. of the Air Force, TO 31-3-28 series). On sale by Superintendent of Documents * Members of the Armed Forces should address cognizant military office.

CRPL—F. (Part A). Ionospheric Data.

(Part B). Solar-Geophysical Data.

Limited distribution. These publications are in general disseminated only to those individuals or scientific organizations which collaborate in the exchange of ionospheric, solar, geomagnetic or other radio propagation data.

Catalog of Data:

A catalog of records and data on file at the U. S. IGY World Data Center A for Airglow and Ionosphere, Boulder Laboratories, National Bureau of Standards, which includes a fee schedule to cover the cost of supplying copies, is available upon request.

The publications listed above may be obtained without charge from the Central Radio Propagation Laboratory, National Bureau of Standards, Boulder Laboratories, Boulder, Colorado, unless otherwise indicated. Please note that the F series is not generally available.

Circulars of the National Bureau of Standards pertaining to Radio Sky Wave Transmission:

NBS Circular 462. Ionospheric Radio Propagation. \$1.25.

NBS Circular 465. Instructions for the Use of Basic Radio Propagation Predictions. 30 cents.

NBS Circular 557. Worldwide Radio Noise Levels Expected in the Frequency Band 10 Kilocycles to 100 Megacycles. 30 cents.

NBS Circular 582. Worldwide Occurrence of Sporadic E. \$3.25.

These Circulars are on sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Members of the Armed Forces should address the respective military office having cognizance of radio wave propagation.

* For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. Price 10 cents (single copy). Subscription Price: \$1.00 a year; 50 cents additional for foreign mailing.

